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TWENTY-FOURTH ANNUAL REPORT

OF THE

SECRETARY

OF THE

STATE BOARD OF HEALTH

OF THE

STATE OF MICHIGAN

FOR THE

FISCAL YEAR ENDING JUNE 30, 1896.

MICHIGAN STATE BOARD OF HEALTH SEAL.

BY AUTHORITY.

LANSING
ROBERT SMITH PRINTING CO., STATE PRINTERS AND BINDERS
1897.

RESOLUTION OF THE BOARD RELATIVE TO PAPERS PUBLISHED IN ITS ANNUAL REPORT.

Resolved, That no papers shall be published in the Annual Report of this Board except such as are ordered or approved for purposes of such publication by a majority of the members of the Board; and that any such paper shall be published over the signature of the writer, who shall be entitled to the credit of its production, as well as responsible for the statements of facts and opinions expressed therein.

Office of the Secretary of the State Board of Health,
LANSING, MICHIGAN, *December, 1896.*

TO HON. JOHN T. RICH, *Governor of Michigan:*

SIR:—In compliance with the laws of this State, I present to you the accompanying Report for the fiscal year ending June 30, 1896.

Very respectfully,

HENRY B. BAKER,

Secretary of the State Board of Health.

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REPORT.

[PART I.]

This is the Twenty-fourth Annual Report of the Secretary of the Michigan State Board of Health, and is for the fiscal year ending June 30, 1896. It is arranged and paged in two parts. The first part contains the Secretary's report of the work of the Board, of the work of the Office of the Board, and the annual report of property, including accessions to the library with names of donors. The second part contains papers, abstracts and reports—including one on the "Principal Meteorological Conditions in Michigan in 1895," one on "The Time of Greatest Prevalence of each Disease," being a Study of the Causes of Sickness in Michigan, especially in 1895, one on the dangerous "Communicable Diseases in Michigan in 1895"—relating to Diphtheria, Membranous Croup, Scarlet Fever, Typhoid Fever, Small-pox, Measles, Typhus Fever, Whooping-cough, Consumption, Cholera Infantum, Rötheln, Mumps, Glanders, Rabies (hydrophobia), Anthrax, Actinomycosis (lump-jaw), Hog Cholera, Foot and Mouth Disease, Tuberculosis in Cattle, Poisoning by Oranges, Poisoning from Dried Beef, Suspected Tyrotoxicon Poisoning, one on "Injuries and Losses of Life and Property from the Use of Kerosene," one on "Injuries and Loss of Life from the Use of Gasoline," and one on "Alleged Nuisances in Michigan in 1895."

Some of these reports include the extensive and valuable statistics on the subjects of sickness, meteorological conditions, etc., collected at the office of the State Board of Health.

Under the law, the Secretary of the Board is required to disseminate information "through an Annual Report and otherwise," and, by direction of the Board, he issues immediately after the close of each week, a bulletin which shows the sickness during the week just passed; also a monthly bullentin; and sometimes publishes quarterly proceedings of the work of the Board and the condition of health in Michigan during the quarter. The proceedings of sanitary conventions are published as soon as practicable after the occurrence of each convention. The office disseminates information by means of the telegraph, the telephone, by letter, and especially by means of hektographed statements prepared and distributed to members of the Board and others interested in public-health work, and to newspapers in Michigan. Thus items of sanitary interest in Michigan which are regarded as useful "news" are published at once in the comparatively ephemeral bulletins, etc., while the Annual Report is issued, not as a newspaper or journal is, as an ephemeral publication, but as a permanent official record of the work of the State Board of Health, and in the office of the Board, and of the local boards of health throughout the State. The annual report contains also statistics which require a great deal of painstaking care in their preparation, and which it is hoped will be useful, for all time to come, to those who study the causation of diseases; and through their labors, to the people of the State and country; and the statistics are there preserved in a permanent form, accessible, for purposes of study, to a comparatively large number of persons.

However, only about six thousand copies of the Annual Report are printed, to supply the two millions and more inhabitants of Michigan; and only 3,500 of those copies are at the disposal of the State Board of Health. Of these, some are sent to libraries, some are sent in exchange for the publications of other State Boards of Health, of prominent city boards of health, sanitary journals, authors of sanitary monographs, etc., others are sent to persons likely to make good use of them, including each of the fifteen hundred health officers in Michigan.

The names and postoffice addresses of the members of the Board, and the dates of the expiration of their terms of office, are as follows:

Mason W. Gray, M. D., Pontiac, July 1, 1897.
Hon. Frank Wells, *President of the Board*, Lansing, July 1, 1897
Samuel G. Milner, M. D , Grand Rapids, Jan. 31, 1899.
George H. Granger, M. D., Bay City, Jan. 31, 1899.
Delos Fall, M. S., Albion, Jan. 31, 1901.
Hon. Aaron V. McAlvay, Manistee, Jan. 31, 1901.
Henry B. Baker, M. D., *Secretary of the Board*, Lansing.

The members of the State Board of Health, with the exception of the Secretary, are appointed for the term of six years, and receive no salary or *per diem* compensation for their services.

STANDING COMMITTEES.*

1. Epidemic, endemic and Communicable Diseases.—George H. Granger, M. D.
2. Sewerage, and the Disposal of Excreta.—Mason W. Gray, M. D.
3. Water supply, including purification of sewage — contaminated water.—Prof. Delos Fall, M. S.
4. Buildings, including house drainage, ventilation, heating, etc.—Samuel G. Milner, M. D.
5. Climate, geology, topography, and drainage.—Henry B. Baker, M. D.
6. Food, drinks and their adulterations.—Prof. Delos Fall, M. S.
7. Poisons, explosives, etc.—Prof. Delos Fall, M. S.

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* Committees as re-arranged and adopted by the Board, Sept. 29, 1893; members as appointed by President Wells, July 12, 1895.

8. School hygiene and sanitation.–Samuel G. Milner, M. D.
9. Sanitary inspection in Cities and Villages.—Hon. Aaron V. McAlvay.
10. Statistics of Mortality and sickness.—Henry B. Baker, M. D.
11. Public-Health legislation.—Hon. Aaron V. McAlvay.
12. Finances of the Board.—Hon. Frank Wells.
13. Animals' diseases dangerous to man.—Mason W. Gray, M. D.
14. Relations of preventable sickness to taxation.—George H. Granger, M. D.
15. Quarantine at the Michigan border and within the State.—Hon. Frank Wells.

WORK OF THE STATE BOARD OF HEALTH DURING THE FISCAL YEAR ENDING JUNE 30, 1896.

Aside from the work in committees and in connection with the office of the Secretary of the Board, the work of the State Board of Health itself includes that done by means of sanitary conventions, the examination of plans and specifications for proposed public buildings, under Sec. 7, Act 206, Laws of 1881, §418, Howell's Statutes, amended by Act 86, Laws of 1889, and work done at regular and special meetings.

SANITARY CONVENTIONS.

No sanitary convention was held in Michigan under the auspices of the State Board of Health during the fiscal year ending June 30, 1896.

The act of the legislature which appropriates two thousand dollars for sanitary conventions specifies also several other purposes; in recent years these other purposes have demanded so much that little has been left for Sanitary Conventions. Particularly has this been the case since the passage of Act 146 of 1895 for which there was no appropriation, and which had to be fulfilled by the use of the above-mentioned appropriation for sanitary conventions and other purposes.

For a few years, the appropriations for the Board have been entirely too small to hold as many conventions as it was wished, but this is the first year since Act 241, laws of 1881, went into effect that the Board has not held at least one convention; and, in some years as many as five or six have been held.

The first sanitary convention was held in Detroit, Jan. 7 and 8, 1880. Up to the close of the fiscal year 1895, the Board had held in different parts of the State forty-two such conventions; the forty-second convention being held at Charlotte, Nov. 22 and 23, 1894.

EXAMINATION OF PLANS FOR STATE BUILDINGS, SEWERAGE, VENTILATION AND HEATING, DURING THE FISCAL YEAR ENDING JUNE 30, 1896.

Act No. 206, Laws of 1881, (§418, Howell's Annotated Statutes), as amended by Act No. 86, Laws of 1889, is as follows:

Plans for buildings, to whom submitted.

14. SEC. 7. That before the board of any charitable, penal or reformatory institution shall determine on the plan of any building, or on any system of sewerage, ventilation, or heating, which has been authorized by the legislature to be constructed, such plan shall be submitted to the board of corrections and charities and the State board of health for examination and opinion thereon; and the board so submitting such plan shall, in its biennial report, show to what extent it was approved by the boards so examining them. * * * That it shall be the duty of said State boards to visit said penal, charitable and reformatory institutions, when necessary to make the examinations herein required, and their official expenses necessarily incurred shall be audited by the board of State auditors and paid from the general fund.—§418.

A PROPOSED NEW COTTAGE DORMITORY FOR BOYS AT THE MICHIGAN SCHOOL FOR THE DEAF, AT FLINT, MICHIGAN.

In pursuance of a call by the president, the State Board of Health met in special meeting, at Lansing, Nov. 15, 1895, for the purpose of the examination of the plans and specifications for a proposed new cottage dormitory for boys at the Michigan School for the Deaf at Flint. The members present were Hon. Frank Wells, president, Lansing; Dr. Mason W. Gray, of Pontiac; Judge A. V. McAlvay, of Manistee; Prof. Delos Fall, of Albion, and Henry B. Baker, M. D., Secretary. Superintendent F. D. Clarke, of the School for the Deaf, and Architect A. E. Bowd, were present and explained the plans and specifications.

After careful examination the following commendations and recommendations were made:—

This Board approves of the proposal that both the outside doors open outward, as shown by the plans.

This Board recommends:—

1. That the heating be by the indirect method.
2. That the ventilating shafts and openings be sufficient to give for each occupant at least 2,000 cu. ft. of fresh air per hour when there is a difference between the outside and inside temperature of not more than ten degrees.*
3. That the fresh air be supplied to the heating radiators in the basement by air-tight conduits from the outer air; and the outside openings of the fresh-air inlets be at least one foot above the ground.
4. That the foul-air shafts from each room go separate and distinct to the outer air, and that each be of uniform size throughout, and smooth inside.

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* [The height of the shaft being known, the velocity in linear feet per minute, under such conditions, is shown in a table on page 178, Parkes' Practical Hygiene, Pub. by Churchill, Fifth Edition. The table is reproduced on page 38 of the Proceedings of the Sanitary Convention held at Charlotte, Mich., published by this State Board of Health.]

5. That the foul-air shafts be on an inner wall; and that the foul-air registers be placed under windows, the foul air to be carried immediately under the floor in air-tight conduits across to the foul-air shafts.

6. That the soil-pipe and all sewer pipes be of iron until they reach the outside of the building.

7. That the porous tile drain around the footing should not connect with the sewer, as shown by the plans, but should have a separate outlet.

8. That the rain-water conductors do not empty into the sewer, (and, therefore, serve as sewer ventilators possibly delivering sewer air near upper windows,) but that a separate drain be constructed to carry away the rain-water.

With the above-mentioned exceptions, the plans and specifications were approved, so far as this Board is required by law to examine and express an opinion.

HENRY B. BAKER,
Secretary.

OFFICE OF THE SECRETARY
OF THE STATE BOARD OF HEALTH,
Lansing, Mich., Nov. 20, 1895.

A PROPOSED NEW COTTAGE AND BOILER HOUSE AT THE MICHIGAN ASYLUM FOR DANGEROUS AND CRIMINAL INSANE, AT IONIA, MICHIGAN.

In pursuance of a call by the president, the State Board of Health met in special meeting at Lansing, Feb. 14, 1896, one of the purposes being the examination of the plans and specifications for the proposed new cottage and boiler house at the Michigan Asylum for Dangerous and Criminal Insane at Ionia. The members present were Hon. Frank Wells, president, Lansing; Hon. Aaron V. McAlvay, Manistee; Prof. Delos Fall, Albion; and Henry B. Baker, M. D., secretary, Lansing. Medical Superintendent O. R. Long, M. D., was present and explained the plans and specifications.

After careful examination the following recommendations were made:

1. That the rain-water conductors do not empty into the sewer.

2. That if this recommendation is not adopted the connections with the sewer should not be, as shown on the plans, at six different places, but as many of the conductors as possible should be brought together and the connection with the sewer properly trapped and ventilated.

3. That any rain conductor pipe passing inside the building should be of cast iron with lead joints.

4. That the tile subsoil drains around the footings do not empty into the sewer.

5. That if the drainage of the basement in any way connects with the sewer, bell traps be not used, but instead stoneware traps with deep seal, and that there should also be a properly ventilated trap at the point where it connects with the sewer.

6. That, relative to the main sewer where it passes under the building, unless substituted by iron pipe with tightly calked joints, excavation down to and around it be made and the present sewer pipe be enclosed on all sides in at least six inches of concrete.

7. That the catch-basin for sewage be not placed in the angle of the building as shown by the plans, but be removed to at least thirty feet distant from any portion of the building.

8. That the trap now shown to be in the basement at the foot of the soil pipe be removed to near the catch-basin and there be ventilated by a six-inch opening.

9. That the iron sewer pipes extend at least six feet from the building, before connecting with the stoneware pipe.

10. That the ventilation from the water-closet rooms be separate from the ventilation of any other room, that the ventilating shafts go separate and distinct to the outer air, extend far enough above the roof, and be protected in such a way by cowls or otherwise as to secure a draft and prevent back drafts.

11. That all indirect radiators in the basement be entirely enclosed except where the outer air is allowed to enter, and the warm air to pass upward,—that is that no basement air be permitted to reach them.

Regret was expressed by members of the Board that the ventilating shafts generally were not planned to extend separately from each room to the outer air, but were nearly all made to enter two common ducts in the attic, one in the main building and one in the wing. The draft in these, however, was claimed to be accelerated by means of steam coils. And, on account of the large number of small rooms, it seems to be difficult, perhaps impracticable, to have a separate foul-air shaft for each room.

The view was also expressed that the foul-air registers in all rooms should be at the floor level, and not, as shown by the plans for the several cells, both at the ceiling and at the floor level.

With the above-mentioned exceptions, the plans and specifications were approved, so far as this Board is required by law to examine and express an opinion.

Henry B. Baker,
Secretary.

Office of the Secretary
of the State Board of Health,
Lansing, Mich., Feb. 14, 1896.

A PROPOSED NEW DORMITORY AND SCHOOL-ROOM COTTAGE AT THE STATE INDUSTRIAL SCHOOL FOR BOYS AT LANSING, MICHIGAN.

In pursuance of a call by the president, the State Board of Health met in special meeting, at Lansing, Feb. 14, 1896, one purpose being the examination of the plans and specifications for a proposed new dormitory cottage at the State Industrial School for Boys at Lansing. The members present were Hon. Frank Wells, president, Lansing; Hon. Aaron V. McAlvay, Manistee; Prof. Delos Fall, Albion; and Henry B. Baker, M. D., Secretary, Lansing. Hon. Wm. Donovan of Lansing, president of the Board of Control of the State Industrial School, and Architect A. E. Bowd, were present to explain the plans.

After careful examination, the following recommendations were made:

1. That there be ventilation to each "emergency" water-closet on the second and third floors, the shaft of each of which shall go separate and distinct to the outer air.

2. It is understood that all foul-air registers shall be at the floor level. This is commended. It is also understood that all foul-air shafts extend from each room separately to the outer air above. This also is commended.

3. That in the school room and dormitories the foul-air registers, so far as possible, should be on those sides of the room where the windows are,

the understanding being that at least one large register shall be placed on the south side, and that the foul air be taken under the floor to a separate shaft, on the interior wall, which shall go separate and distinct to the outer air.

4. That there be an impervious floor over the water-closets, between the basement and the first floor.

5. That there be ventilation from both the level of the floor and of the ceiling in the main water-closet in the basement; each duct leading to a separate shaft.

6. That there be a fresh-air inlet to that part of the sewer which passes under the urinals, closets, sinks, etc., in the basement, through a four-inch iron pipe which shall come to the surface of the ground at least ten feet from the building, and that the outside opening be properly protected.

7. That the connection of the rain-water and tile drains to the sewer be through a trap in or near a man hole, where the drains and sewer pipe come together; the sewer pipe being trapped separately.

8. That the surface drainage of the basement be conveyed to the rain-water drain, and the openings be properly trapped.

9. That all fixtures in the building be trapped, and the traps ventilated.

10. We understand that the ventilation of all fixtures is to be to a separate pipe which enters the soil pipe in the attic above the highest fixture. This is approved.

11. That the local vents of water-closets do not directly or indirectly enter the soil pipe, but enter a separate pipe or shaft which shall extend above the roof.

With the above-mentioned exceptions, the plans and specifications were approved, so far as this Board is required by law to examine and express an opinion.

Henry B. Baker,
Secretary.

Office of the Secretary
of the State Board of Health,
Lansing, Mich., Feb. 15, 1896.

A PROPOSED INFIRMARY BUILDING, AND A PROPOSED COTTAGE DORMITORY FOR THE UPPER PENINSULA HOSPITAL FOR THE INSANE AT NEWBERRY, MICHIGAN.

At the meeting of the Michigan State Board of Health at Lansing, April 10, 1896, the plans and specifications for a proposed Infirmary building and for a proposed cottage dormitory for the Upper Peninsula Hospital for the Insane at Newberry, Mich., were examined, and the following recommendations were made:—

(1.) That the fresh-air be conducted, from windows open to the outer air, to indirect radiators in the basement of the cottage, by *special* air-tight shaft or shafts, instead of passing through corridors which may become contaminated by the sputa or infected shoes or clothing of those walking through them.

(2.) That *separate* outlet ventilating shafts be provided for the two dining rooms of the Cottage. This may be done by a galvanized-iron partition in the single flue shown on the plans.

(3.) That ventilation be provided for the entire third story of the Infirmary, similar in principle to that proposed for the other floors. The *direct* system of heating should not be used there. If necessary, the fresh air to the "Anæsthetic" and to the "Operating" room can be filtered before entering the rooms.

(4.) That the ventilating loft under the ridge of the roof be partitioned across where the foul-air shafts enter the same, so as to provide for each shaft a separate outlet to the outer air.

(5.) That the clothes shute of the Infirmary be closed at the top, so as not to discharge infected or dusty air in the vicinity of a window.

(6.) That water supply and provision for the washing of hands be provided in the Morgue of the Infirmary; also that, in addition to the ordinary vent register there be special *outlet* ventilation provided for the slab in the Morgue for the purpose of removing air from the vicinity of the corpse.

(7.) That the outlets of the grease-traps of both buildings be properly trapped from the main sewer.

The system of ventilation proposed for the Infirmary consists in taking the fresh air from a suitable point outside the building, conducting it by special flues to the indirect radiators in the basement, from thence to the several rooms through galvanized sheet iron flues, and delivered into the rooms at or near the ceiling level. The foul air is to be removed by registers placed at the floor level under the windows, (except in rooms where the foul-air shafts are located near the windows,) and communicating, by a galvanized sheet iron flue placed between the joists, with the foul-air upcast shafts. Each water closet apartment is to be provided with separate and special means of ventilation. This system is approved and commended by this Board.

The foul air is to be removed from each room by a separate shaft or flue carried independently to the top of the roof, under the ridge. This, also, is approved and commended by this Board; but paragraph number 4, above, contains a recommendation on this subject.

If the recommendations of this Board embodied in the preceding paragraph numbered "1", be carried out, the ventilation of the Cottage will be substantially the same as above-described for the Infirmary.

The foul-air shafts are planned to terminate, in a single line, not in a group, immediately under the ridge of the roof, the openings at the sides of the ridge being protected by louvres. The construction is such that it is claimed that air pressure from either side will accelerate the upward movement of air in the foul-air shafts.

This method of terminating the foul-air shafts at the roof is commended to those architects and others who have not heretofore seen a good way to have numerous foul-air shafts open separately at or above the roof.

With the above-mentioned exceptions, the plans and specifications were approved, so far as this Board is required by law to examine and express an opinion.

HENRY B. BAKER,
Secretary.

OFFICE OF THE SECRETARY OF THE
MICHIGAN STATE BOARD OF HEALH,
Lansing, April 25, 1896.

REGULAR AND SPECIAL MEETINGS OF THE STATE BOARD OF HEALTH, DURING THE FISCAL YEAR ENDING JUNE 30, 1896.

REGULAR MEETING AT LANSING, JULY 12, 1895.

The meeting was called to order by President Frank Wells, of Lansing. The following members were present: Prof. Delos Fall, Samuel G. Milner, M. D., Hon. Aaron V. McAlvay, and Secretary Henry B. Baker. (Mason W. Gray, M. D., came in at 11:10 a. m. and took his seat as a member of the Board).

The Secretary presented and read the minutes of the regular meeting, April 12, and they were approved as read.

State Board of Health vouchers number 2570 and numbers 2576 to 2599 inclusive, were considered and allowed.

Secretary Baker read a list of fifteen items of business which he wished to bring before the Board if there were opportunity.

Dr. Milner announced that he would offer a resolution relative to classification of the clerks of the office, and to place the office on a civil service basis.

President Wells announced that he would make some recommendations relative to the work of the office, and under the order of "Communications by the President" he read nine pages of manuscript which he had prepared, relative to the business management of the office.

On motion of Prof. Fall, the Board voted that President Wells' recommendations be placed on file, that they be a part of the records of the office, and that the Board consider them in executive session at 1:30 p. m.

President Wells read the rearrangement of the Standing Committees, in accordance with his appointments.

Secretary Baker read proposed resolutions, relative to a Chief Clerk, as follows:—

Resolved, That the Secretary be authorized to appoint from the present force of clerks, a clerk to the position of Chief Clerk, who shall hold the position during the pleasure of the Secretary, but may be displaced at any time by a majority of the Board.

Resolved, That the position of Chief Clerk and that of Correspondence Clerk may or may not be one, in the discretion of the Secretary.

Resolved, That said Chief Clerk shall, under the direction of the Secretary, have supervision of the clerks, and of the business of the office, and carry out the directions of the Secretary in the absence of the Secretary.

Resolved, That, under the direction of the Secretary, such Chief Clerk shall by means of the newspapers and otherwise, endeavor to popularize the work and the results of the work of the Board.

Resolved, That at meetings of the Board, such Chief Clerk shall act as clerk of the Board.

No action was then taken, it being understood that these resolutions would be considered in the executive session.

Dr. Milner offered the following resolutions:—

Resolved, That hereafter the appointment of clerks in this department shall be made in accordance with the principles of civil service, the service being classified if necessary, and appointment being made in each class by promotion for merit and length of service, or by examination; salaries to be graded according to class and term of service.

Resolved, That the President, Secretary, and one other member appointed by the President, constitute a committee who shall present the details of a plan in accord with the principles above stated.

No formal action was then taken, it was understood that the consideration of Dr. Milner's resolution should be during the executive session.

On motion the Board took a recess from 12:25 p. m. to 1:30 p. m.

Afternoon Session at 1:30.

At 1:30 the Board went into executive session, President Wells, Doctors Milner and Gray, Prof. Fall, Hon. Mr. McAlvay, and Secretary Baker being present.

Doctor Gray moved that the recommendations of the President be adopted.

President Wells said, in order to simplify the recommendations, he would say that temporary extra clerks should be appointed to put all three rooms in complete order.

Mr. McAlvay said there should be employed a young man of capabilities sufficient to fit him for learning the work, and to be able to do the work in case the Secretary is taken away in any manner.

On the general subjects under consideration, Doctor Milner, Prof. Fall, and other members of the board expressed themselves.

Doctor Gray's motion was voted upon, and prevailed.

All applications for clerkships and recommendations were presented and the applications read; the name of each person commending an applicant was read; and in many cases letters of recommendation were read.

On motion, the Board voted that Mrs. Breck be employed, temporarily.

On motion, the Board voted that James McHenry of Clinton Co., be employed, temporarily.

On motion, the board voted that Roberts P. Hudson of Flint, be employed, temporarily.

The Secretary presented the annual report of property. The report was accepted, placed on file, and referred to the committee on finance.*

On motion, the Board adjourned the *executive session*, and went into open session at 4:45 p. m.

Dr. Gray left at 4:45 to take the train for Pontiac.

The Secretary presented and read portions of the report relative to Public-Health Legislation in 1895.†

On motion of Doctor Milner the report was accepted, placed on file, and the Secretary was directed to make the report ready for the Annual Report.

The Secretary presented and read portions of his report of work of the office during the second quarter of 1895.‡

Doctor Milner moved that the seven laws relative to public health enacted by the Legislature of 1895 be printed in the pamphlet proceedings of this meeting of the Board.

Doctor Baker moved, as a substitute for Dr. Milner's motion, and the Board voted that the pamphlet containing the "public health laws in force in 1890" be revised so as to include the laws relating to public health in force in Michigan in 1895, and be printed as a supplement to the Annual Report of the Board.

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* The Secretary's report of property is printed on pages cxxxvii—cxlix of the report of this Board for 1895.

† The report on "Public-Health Legislation in Michigan in 1895" is on pages c—cxxxvii of the report of this Board for 1895.

‡ Printed on pages lxv—lxxi of the report for 1895.

The Secretary presented and read Doctor Vaughan's report of an examination of oranges (from Coral, Mich.,) suspected of causing poisoning. The report was accepted and placed on file.*

The Secretary presented Doctor Vaughan's report of a visit to the State Public School at Coldwater where he attended an examination of a herd of cows affected with tuberculosis. The report was received and placed on file.†

The consideration of the proposed leaflet and circular relative to teaching hygiene in the public schools, was made the special order for 7:00 p. m.

The Secretary presented the bill of Hon. S. S. Olds, and that of Henry A. Haigh, both for services as attorneys in connection with the Legislative Investigation of the State Board of Health.

In explanation, the Secretary said that prior to employing Mr. Olds he applied to the Attorney General, Mr. Maynard, for his assistance during the investigation, but the Attorney General put him off saying that he (the Secretary) could conduct the examination better than any other person. The services of Mr. Olds were then secured, and later during the investigation the services of Mr. Haigh were secured, Mr. Olds not being able to give the subject the attention necessary. The Secretary also explained that when the investigation was in progress, the assistant attorney general was detailed to help the chairman of the investigating committee prosecute the Board. Secretary Baker also explained that, because of sickness, he was himself not physically able to conduct the investigation; and as the prosecution was conducted by an attorney, the President and Secretary of the State Board deemed it wise that the Board be represented by an attorney.

Mr. Olds' bill to the Board amounted to $200.00 and Mr. Haigh's bill for services and expenses amounted to $236.35. In connection with Mr. Olds' bill the Secretary read a letter from Mr. Olds.

All members present thought the bills should be allowed, and that the preservation of the State Board of Health was a matter of sufficient public-health interest to the people of Michigan for the bills to be paid out of the appropriation for the "incidental expenses of the office of the Board." But at the same time members thought it a subject upon which the Board should be sure that it was right before action was taken. Further consideration of the two bills was deferred until the evening session.

The subject of sending a delegate to the meeting of the American Public Health Association at Denver, Colorado, in October, 1895, was presented and discussed, but the Board did not appoint a delegate.

The question of sending delegates to the meeting of the Miss. Valley Medical Association, at Detroit, Sept. 3–6, 1895, was discussed, and the Board appointed Doctors Milner and Gray to represent the Board at that meeting.‡

The Secretary presented the question of letter-headings for members of this Board. Several styles of heading were examined, and the Secretary was directed to prepare copy for a suitable letter-heading similar to that of the Secretary of State's, and submit it to the members before printing.

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* Dr. Vaughan's report on the examination of alleged poisonous oranges is printed in this Annual Report.

† Dr. Vaughan's report of his examination of the herd at the State Public School at Coldwater is printed in this Annual Report.

‡ Dr. Gray, at his own expense, attended one session of the meeting of the Association, but made no written report.

The list of health officers in Michigan 1895–96 was ordered printed to the number of 1,600 copies.

On motion the Board took a recess at 5:40 p. m., to meet again at 7:00 p. m.

Evening Session, at 7:00 p. m.

The meeting was called to order by President Wells, and Prof. Fall, Judge McAlvay, Dr. Milner and Secretary Baker were present.

The discussion of the proposed circular to School Commissioners and others and of the leaflet to teachers, etc., having been made the special order, the Secretary read the proposed circular and the proposed leaflet. After considerable discussion and a few amendments, on motion of Prof. Fall the Secretary was directed to edit, if necessary, and order printed 10,000 copies of the circular No. [227.] and 20,000 copies of the leaflet No. [226.]*

On motion of Judge McAlvay Mr. Olds' bill for $200.00 and Mr. Haigh's bill for $236.35 were allowed.

On motion of Prof. Fall the Board voted that either of the appointments of Mrs. Breck and Messrs. Hudson and McHenry, to temporary clerkships might be annulled by the President and Secretary, should just cause and reason hereafter present itself.

The question of whether the Secretary should assume the responsibility of discharging a clerk of the office in case where it seemed necessary, was asked and discussed. There was no formal action, but the members seemed to hold the view that in case of insubordination, non-compliance with rules, etc., the President and Secretary should use their judgment whether or not a clerk should be suspended until the next meeting of the Board.

On motion the Board voted that the Secretary and President be empowered to appoint two additional temporary clerks, subject to confirmation by the members of the Board by correspondence.

Judge McAlvay and Doctor Milner left at 7:15 to take the train home.

On motion of Doctor Baker it was voted to order from the State Printer 800 additional copies of the extract from Prof. Fall's paper on "Better Methods for Teaching Hygiene," the paper having been read at the Charlotte Sanitary Convention.

On motion of Prof. Fall the Board adjourned at 8:30 p. m.

HENRY B. BAKER,
Secretary.

REGULAR MEETING AT LANSING, OCT. 11, 1895.

The meeting was called to order by President Frank Wells; Prof. Fall A. V. McAlvay, Doctors Milner, Granger and Secretary Baker were present.

Secretary Baker read a letter from Dr. Gray which stated that he would be unable to attend.

The minutes of the regular meeting July 12, were read by the Secretary, and approved by the Board.

State Board of Health vouchers number 2600 and numbers 2607 to 2618, inclusive, were considered and allowed by the Board.

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* Circulars [No. 226] and [No. 227] are reproduced on subsequent pages of this Report.

On motion of Judge McAlvay, the Board voted to authorize the Secretary to order the periodicals for the office for 1896, according to the bill presented by the Secretary, and considered by the Board.

Doctor Milner gave notice that he would again offer his resolution which provided for placing the office on a civil service basis.

Secretary Baker read a list of eighteen items of business he would bring before the Board if there were opportunity.

President Wells made remarks somewhat as follows:—At the last meeting, the Board appointed three clerks and authorized the President and Secretary to employ one or two additional temporary clerks, but the Secretary and President did not see fit to employ other help. Those clerks appointed by the Board have been employed on valuable work, and the work of the office has progressed, but the work which I supposed these new clerks would do has not been done—I refer to cleaning up the office and making our office look as attractive as do other offices in the building. I am of the same opinion as I was at the last meeting, and I believe that clerks enough should be put in to do the regular work and also to do the work I have suggested.

Doctor Granger moved that enough clerks be employed to clean up the office. (No action taken at this time, but later in the proceedings mention is made of the appointment of new clerks.)

Secretary Baker remarked somewhat as follows: I am very glad indeed to hear that the President of the Board favors more clerks; the very thing the President would like has been my idea for years and I have urged the Board to put in clerks enough to bring up the work, and put the office in better order; but it has not been done. Notwithstanding many of the clerks have taken their vacation this last quarter, much work has been done, some of which has been very valuable as my quarterly report will show. It is a mistake, however, to suppose that nothing in the way of cleaning up has been done; much of that kind of work has been done, and one of the new clerks, Mr. McHenry, has done very little else. I have spent considerable time with that kind of work, and tons of material which had apparently passed its period of usefulness, has been taken out; the library has been put in better order; a portion of the case under the clock has been cleaned out for the plates; and much work in this direction has been done. I should have done more in that direction, but the regular work of the office has demanded my attention. I consider the life-saving work the office is doing of a great deal more importance than the work of cleaning up, although much of that work has recently been done. I hope the Board will appoint the clerks, and not delegate that authority to the President and Secretary.

The Secretary presented and read a statement regarding the usual custom of raising the salaries of clerks, stating that before he raised the salaries of the new clerks any higher he would like an expression of the views of the members, because there had been some objection to the rapidity with which the clerks reached the limit specified in the law.

On motion, the Board voted that the compensation of the new clerks be left at sixty-five dollars per month until further action by the Board.

Dr. Milner offered the following resolutions:—

Resolved, That hereafter the appointment of clerks in this department shall be made in accordance with the principles of civil service, the service being classified if necessary, and appointments being made in each class by promotion for merit and length of service, or by examination; salaries to be graded according to class and term of service.

Resolved, That the President, Secretary and one other member appointed by the President, constitute a committee who shall present the details of a plan in accord with the principles above stated.

Prof. Fall said that he believed in Doctor Milner's resolutions and hoped they would be adopted by the Board. It will put the work on a scientific basis, and competent men could be employed who would not only do the regular work of the office but could make valuable contributions, similar to those which have been made by former clerks of the office, and similar to those made by clerks and assistants in the government departments. This is what should be done; it would give the Secretary more time to do other work. We ought to be able to get young men with a college education, capable of doing the very best kind of work, and work in a literary line. The salaries paid are ample, and good men could be secured.

Doctor Granger believed in the underlying principle of the resolutions, and thought that if the Board should take the initiatory step it would gain much respect of the people of the State.

Judge McAlvay believed the resolution a good one, and thought it should pass. He thought that should the Board start the movement, it would be only a question of a few years when all the State departments would be put on the same basis.

President Wells believed the resolution should be adopted. He said he was confident that much of the work of the office could be done for a great deal less money; that perhaps some of the work was worthy of more compensation; and that the salaries should be graded.

Secretary Baker said he thought that the clerks all earned their money, and that there had been some first-class clerks who had left the office only to receive better salaries elsewhere. He mentioned John Allen, Henry Haigh, Erwin F. Smith, Howard Holmes, etc. and said that he thought if the Board could have paid higher salaries at least one or two of those most excellent clerks could have been retained to the benefit of the State. He knew that our clerks have worked as hard as, if not harder than, clerks of other departments, and have taken interest in the work, and many have taken special interest in the work of the Board, and have made valuable contributions. The Board had never been criticised that he knew of on account of the salaries paid to the clerks. He was in favor of trying to get the best clerks possible, and would like to so compensate them that such experienced clerks could be retained.

On motion of Judge McAlvay, Doctor Milner's resolutions were adopted by the Board.

The President appointed Doctor Milner the other member of the committee to formulate detailed plans to place the office on a civil-service basis.

On motion of Doctor Granger, the Board voted that the secretary be authorized to discharge any clerk in case of insubordination, non-compliance with rules or incompetency.

At 12:15 the Board took a recess to meet again at 1:00 P. M.

Afternoon Session, at 1:30 P. M.

President Wells, Prof. Fall, Judge McAlvay, and Doctors Granger, and Milner, and Secretary Baker were present.

The secretary presented a communication from Doctor George H. Cattermole, asking for a leave of absence from Nov., 1895, to April, 1896, to spend the winter in the south.

On motion of Doctor Milner, Doctor Cattermole was granted a leave of absence in accordance with his application.

The secretary presented the subject of new clerks.

Judge McAlvay thought that as there were practically two vacancies, the Board should at least appoint new clerks to fill those vacancies. He believed the work should be brought up to date.

Prof. Fall was of the opinion that enough clerks should be employed to bring the work up to date; and after that was accomplished the force could then be cut down; that clerks should be appointed with the idea that their positions were only temporary. The work should by all means be brought up to date before the next legislature convenes; the work being so much behind was against us this last session.

Mr. Wells thought there should be two to fill vacancies, and one other additional one to do the cleaning up.

The secretary presented the names of the applicants for clerkships, and the names of person commending each, and in some instances the applications and the letters of commendation were read. The applications and commendations were considered.

On motion, the Board voted to employ Mr. Thomas S. Ainge as a clerk in the office, and that, in case of increasing usefulness, Mr. Ainge's salary be increased in the manner heretofore practiced.

On motion, the Board voted to employ Sheldon B. Young as a temporary clerk.

The secretary presented the subject of reprinting a number of the educational leaflets:—

On motion of Doctor Granger the Board voted to reprint leaflet [No. 124.] "The Prevention of Typhoid Fever," to the number of 10,000 copies.

On motion of Doctor Granger the Board voted to reprint the leaflet [No. 106.] "Restriction and Prevention of Diphtheria" to the number of 20,000 copies.

On motion of Doctor Granger the Board voted to reprint the leaflet [No. 175.] "Restriction and Prevention of Consumption" to the number of 10,000 copies.

On motion of Doctor Granger the secretary was authorized to make enquiry to ascertain the best way to have the leaflets on typhoid fever, diphtheria and consumption translated into the German and Holland languages.

The secretary presented a statement relative to the past and present status of small-pox in Michigan.

The secretary presented a statement relative to typhoid fever in Michigan during the third quarter of 1895, and its present status.

The secretary presented his quarterly report of work done in the office during the third quarter of 1895.

The secretary mentioned that during the quarter he had received a copy of a new and interesting publication of the U. S. Weather Bureau entitled "Climate and Health." It was the first number of the publication, and contained a summary of statistics for the four weeks ending July 27, 1895. It promises to be a very valuable publication, and seems to be right in line with the work the Michigan State Board of Health has been doing for years—a study of the relation of the sickness to the meteorological conditions. This work was commenced by Prof. Harrington before he left the Bureau, and I am very glad to see that his successor has seen fit to continue the work, but I am sorry to see that credit for the originality of the scheme is given to the Secretary of Agriculture. Prof. Harrington read a paper outlining such a scheme before the meeting of the American Public Health Association, in the city of Mexico, Nov. 29 to Dec. 2, 1892. At that time I had lengthy talks with him on the subject, and since then I have had more or less correspondence with him, explaining the Michigan system which had given such excellent satisfaction.

Mr. Wells stated that he also had received a copy of "Climate and Health," and had taken much interest in looking it over. He said that the publication showed one interesting point that the death-rates from consumption in California, Louisiana and Florida where consumptives go, was about 20 per cent, while in other parts of the country it was only 10 per cent.

Prof. Fall left at 2:40 to take his train for Albion.

Doctor Granger mentioned that he had received some very valuable publications from the United States Bureau of Animal Industry, regarding the diseases of the horse, the sheep, and other animals.

The secretary presented the question of an expression of views of the members regarding the isolation of consumptives, and the examination of sputa of consumptives.

Doctor Granger thought that tubercular anal fistula was infectious and that the discharges from the bowels of a consumptive were probably infectious.

Doctor Baker remarked that one common result of tuberculosis of the bowels and perhaps of tuberculosis of any part of the body was anal fistula.

Doctor Baker said the State law provided for the isolation of any person suffering from a dangerous communicable disease so long as there is danger of conveying the infection to others, and he thought that the *law* would apply to a tubercular patient as well as in any other disease. The question he had in mind was whether this Board would formulate any statement for the guidance of the people of Michigan.

The members seemed to think that as long as a tubercular patient was careful to destroy all sputa, and was willing to observe the necessary precautions to prevent the spread of the disease, isolation was not necessary. However, as the members were about to take the train and the time was limited, no formal expression of views was given.

The secretary presented and read a letter from the health officer of Kalamazoo, which stated that bacteriological diagnoses were being made in cases of suspected diphtheria in Kalamazoo, and that such examinations were being made at the city's expense.

The secretary presented and read a letter from Dr. Munn of Denver, Col., which suggested a concert of action looking to congress appropriating a certain amount of money yearly for the establishment and support of State Laboratories of Hygiene in connection with State Boards of Health on a plan similar to the present system of agricultural experiment stations.

Doctor Milner left at 3:15 to take the train for Grand Rapids.

On motion of Doctor Granger the Board adjourned at 3:15 p. m.

SPECIAL MEETING AT LANSING, NOV. 15, 1895.

A special meeting of the State Board of Health was held at Lansing, Nov. 15, at 3:30 p. m. The meeting was called by the president for the purpose of the examination of the plans and specifications for a cottage dormitory at the Michigan School for the Deaf, at Flint, Michigan, in accordance with section 418 Howell's Statutes, and for the transaction of such other business as might come before the Board.

The meeting was called to order by President Wells; and Doctor Gray, Judge McAlvay, and secretary Baker were present. (Prof. Delos Fall came in and took his seat as member of the Board at 5:20 p. m.)

Supt. F. D. Clarke of the School, and architect A. E. Bowd of Lansing, were present, to explain the plans and specifications.

After careful consideration the Board voted to make the following commendations and recommendations:—[These recommendations are printed on page xii of this Report.]

On motion of Judge McAlvay the Board voted that, with the above-mentioned exceptions, the plans and specifications be approved, so far as this Board is required by law to examine and express an opinion.

On motion of Doctor Baker, a State Board of Health voucher amounting to fifty ($50.00) for postage in the office of the secretary, was allowed.

On motion of Judge McAlvay, the Board took a recess at 6:00 p. m., to meet again at 7:00 p. m.

Evening Session, at 7:45 p. m., Nov. 15.

The members present at the evening session were: President Wells, Doctor Gray, Prof. Fall, Judge McAlvay and secretary Baker.

The secretary presented a proposed circular to Railroad Officials, Health Officers, Physicians, and others relative to what are dangerous communicable diseases. The circular was read and considered sentence by sentence, amended somewhat, and approved by the Board.

On motion of Doctor Baker, the secretary was authorized to print an edition of 10,000 copies of the proposed circular [No. 228] for distribution where they will do the most good.*

On motion, the Board voted to direct the secretary to make a statement of the commendations and recommendations by the Board in connection with the plans and specifications for the proposed new cottage dormitory at the Michigan School for the Deaf at Flint, and that such statement be transmitted to the Board of Control of that State Institution.

The secretary reported that the distribution of leaflets to teachers, in accordance with the law enacted by the last legislature, had become an important item in the business of the office, and not only required an amount of labor, but was quite expensive to the Board, there being no appropriation provided for that purpose by the law. He mentioned that he had corresponded with the County School Commissioners and requested their coöperation and assistance in distributing the leaflets. In most instances the Commissioner replied that he would see that the leaflets were distributed, but in some instances the Commissioner thought he could neither spend the time nor the money. In some counties the leaflets had to be mailed direct to the numerous teachers. The office of the Superintendent of Public Instruction has kindly aided in the distribution by sending copies of the leaflet No. 226 and circular No. 227 to Teachers' Institutes and elsewhere.

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* Circular [228] is reproduced on subsequent pages of this Report.

The Board thought the work one of the most useful movements that the Board had made in its "campaign of education", and thought the secretary should continue to expend the appropriation so far as he deemed it necessary for this purpose.

Prof. Fall mentioned that he had recently spent some time at teachers' institutes, and he was agreeably surprised to see the intense interest manifested by the teachers. They were not only eager to comply with the law, but many of them had an ambition to make a special study of the subject, in order to better fit them to teach it to their pupils. Prof. Fall said that he had put special stress upon the life-saving work the Board was doing, and would take the diagrams, explain them, and go through the calculations in detail, showing the teachers just how the results were determined; the diagrams needed interpretation. He would explain the way the germs grew, how they could be isolated and examined with a microscope, and how they could be made to produce the disease by injecting into animals. He tried to impress upon them that the "germ theory of disease" was a science.

On motion, the Board voted to authorize the secretary to print a sufficient number of copies of circular No. [227] not to exceed 20,000 copies.

On motion, the Board voted to reprint the leaflet on "The Prevention of Typhoid Fever" to the number of 10,000 copies.

The secretary mentioned that the two plates (Nos. 516 and 517) showing the results of the life-saving work done by the Board were in great demand, and he had ordered 10,000 printed for distribution to teachers and others interested in the work.

On motion of Judge McAlvay the Board authorized the secretary to print 20,000 copies of the four-page leaflet No. [226].

Prof. Fall mentioned that a Prof. B. claiming to come from Detroit was going about the State selling a disinfectant to school boards, etc., which it seemed to him was extremely dangerous; the active principle of the disinfectant being thymol which not only had antiseptic properties but was a strong anæsthetic. The other ingredients were: mercuric chloride, carbolic acid, and wood ashes. The directions for its use provided that the disinfectant be scattered about the school room, on desks, etc. Prof. B. was a very smooth sort of a man; and together with testimonials from prominent men, was able to beguile the people. Prof. Fall mentioned that Prof. B. came to him and wanted a testimonial, but he would not give it. Later Prof. B. called upon Doctor Fiske, the president, and sold some of the disinfectant for Albion college, and told the janitor to scatter it around as that was recommended by Prof. Fall.

Secretary Baker remarked that there were many such articles on the market, and some of the best manufacturing chemists sold them. He thought if the Board took any action they would necessarily have to be careful not to antagonize legitimate and useful preparations.

Prof. Fall mentioned that recently his attention had been called to another fraud in the shape of a preservative which was claimed to be useful in canning fruit. Although the preparation had no preservative properties, the man selling the article had a testimonial which purported to have come from the Iowa State Board of Health.

The secretary read a letter he had received from Prof. W. H. Sherzer of the State Normal School who wanted the State Board of Health to publish the philosophy of vaccination, inoculation, immunity, etc.

Prof. Fall said he could not remember when he had seen a four-page leaflet which was so concise and said more than did No. 226; it was really wonderful the amount of information it contained.

Mr. Wells said that this subject had been brought to his attention, and he was in doubt just how much should be placed before the teachers for teaching. It seemed to him that a short historical account of the germ theory of disease, action of germs on the tissues, formation of ptomaines, etc., would be extremely interesting and valuable knowledge for teachers.

Prof. Fall said he believed such a short history or statement would be extremely valuable and would give confidence in the statements of the Board. He thought there should be a text-book on sanitary science, and thought Doctor Baker should write one.

Mr. Wells thought that Doctor Baker was too busy to write such a book and that Prof. Fall should undertake the work.

Prof. Fall said that he had thought of it but did not wish to do something which should be done by Doctor Baker. He believed that such a book should be written and that now was the time.

On motion of Judge McAlvay the Board adjourned at 10:40 p. m.

REGULAR MEETING AT LANSING, MICHIGAN, JAN. 10, 1896.

The regular meeting of the State Board of Health was held at Lansing, Friday, Jan. 10, 1896, in the office of the secretary. The meeting was called to order by President Wells, and Doctor Milner, Doctor Granger, Judge McAlvay, and Secretary Baker were present.

On motion of Doctor Baker, the rules were suspended and the business of auditing of bills and accounts was transacted.

State Board of Health vouchers numbers 2619 and 2628 to 2655, inclusive, were allowed.

On motion of Doctor Baker, the Board allowed Prof. Fall's bill for expenses in attending this meeting, subject to Prof. Fall's certificate, it being understood that he would be present later.

At 11 a. m. Doctor Gray came in, and at 11:45 Prof. Fall came in, each taking his seat as member of the Board. Every member was then present.

On motion of Doctor Baker, the Board resumed the regular order of business.

The secretary read the minutes of the regular meeting Oct. 11, 1895. That portion of the minutes which gave some remarks by President Wells regarding the death-rate from consumption in winter-health-resort States, was corrected to read as follows:—President Wells said that he had noticed that the official reports from the U. S. Weather Bureau showed that the death-rate from consumption in the southern health-resort States was about double the death-rate from consumption in Michigan and the northern States. He also mentioned that many of the health-resort States are recognizing the fact, and their sanitarians are instituting vigorous measures for the restriction and prevention of consumption.

With the above-mentioned correction the minutes of the regular meeting, Oct. 11, were approved.

Doctor Baker said that many years ago when studying the U. S. Census he had noticed something similar to what Mr. Wells mentioned, namely that the mortality rate from consumption was greater in Louisiana than in Michigan.

The secretary read the minutes of the special meeting of the Board, at Lansing, Nov. 15, 1895, and they were approved as read.

The secretary mentioned that a Prof. B., representing a so-called disinfectant, had called, and had endeavored to get him to recommend the disinfectant which was made up of wood ashes, thymol, corrosive sublimate, etc., and might be very dangerous, as the instructions were to spread it promiscuously over the desks, furniture, etc. This Prof. B. claimed that Prof. Fall had recommended it.

Prof. Fall said that he never recommended the disinfectant, but did tell this Prof. B. that he thought it was dangerous. "However, this Prof. B. is using my name wherever he goes, and I wish there was some way to prevent it."

The Board took a recess from 12:18 to 1:15 p. m.

Afternoon Session, at 1:45 p. m.

The same members were present in the afternoon as were present at the morning session.

The secretary read a list of fifteen items of business which he wished to bring before the Board if there were opportunity.

The president said that during the quarter the secretary and himself held a conference with President Hinds and Doctor Barringer of the State Live Stock Commission and Doctor Grange, State Veterinarian, concerning some cattle which the State Live Stock Commission had condemned to die because they had reacted to the tuberculin test. The meeting was held at the instance of the President of the State Live Stock Commission. It seemed that two herds near Birmingham, Michigan, had been examined and a number of the cattle had reacted to the tuberculin test and would have been slaughtered except that the owners had served an injunction on the State Live Stock Commission; the cattle were then in quarantine. The object of the conference was to place the facts before the Board, with a view that when the time came the Board would probably be asked for assistance in the way of expert testimony, etc. President Hinds thought that it might be advisable for the State Board to ask leave to kill two or three of the cattle for experimental work at the State Laboratory of Hygiene or elsewhere, with a view of proving not only that tuberculosis was communicable, but that it might be spread from these particular cattle. President Wells remarked that this was a very important case, and he hoped the Board would do what they could to aid the State Live Stock Commission.

On motion of Prof. Fall the following preamble and resolution were adopted:—

Whereas, A request has been made by the State Live Stock Commission,

Resolved, That the secretary of the State Board of Health correspond with the president of the State Live Stock Commission stating that the State Board of Health and its officers and members stand ready to do what they can to demonstrate the presence of and contagiousness of tuberculosis in the two herds of cattle near Birmingham, Michigan.

The secretary presented and read a portion of his report of work in the office during the last quarter. The report was received and placed on file.

The secretary presented the subject of reprinting some of the leaflet publications of the office.

On motion of Prof. Fall the Board voted to reprint the leaflet [No. 110] "The restriction and prevention of Scarlet Fever" to the number of 20,000 copies, and circular No. 227 to the number of 10,000 copies.

On motion of Prof. Fall the Board authorized the secretary to return to Mr. D. E. Keyes of Grand Rapids, in accordance with his request, the commendatory letters received in his behalf for a clerkship in this office.

The secretary presented and read a statement of "Why annual reports are required from local health officers."* In this connection he presented and read a letter† (dated Jan. 6, 1896) from Doctor Samuel P. Duffield, health officer of Detroit, in which that officer refused to make his annual report for the year 1895. Since Doctor Duffield had refused to make his reports other health officers and clerks had refused to make their reports. The secretary said such reports were asked for under section 8, Act 81, laws of 1873, but there was no penalty specified in that law, for neglect or refusal to make the reports. He thought the law should be tested, and if it was not sufficient, that a new law, or an amendment to the old law, be planned for the next legislature.

On motion of Judge McAlvay the Board voted that in case of any neglect or refusal on the part of any health officer, clerk, or other officer in Michigan, to make the reports requested by the State Board of Health and required by law, the Secretary be authorized and directed to take the necessary steps to secure such reports from any such officer.

[Relative to the Secretary's efforts in securing an annual report from the health officer of Detroit, see hektograph Nos. 1612, 1613, 1626, 1627, 1628, 1629, 1630, 1632, 1633, 1639, 1645, 1646, 1647.]

The secretary read a letter (dated Jan. 4) and another letter (dated Jan. 8) from health officer Duffield of Detroit, relative to methods employed in Detroit for the restriction and prevention of diphtheria, and relative to the methods in connection with bacteriological diagnoses in cases of suspected diphtheria. Both letters were in response to letters from the Secretary asking for the information.‡

There was some discussion regarding just what were the methods; the secretary said that in his opinion Dr. Duffield's letters stated that in suspected cases where the diphtheria bacillus was found it was not treated as diphtheria unless the clinical symptoms confirmed the bacteriological examination. The President and other members of the Board did not feel sure that that was the correct interpretation of the letters.

The compensation of clerks in the office of the Board was discussed by Judge McAlvay, Prof. Fall and others.

On motion of Judge McAlvay the Board voted that until the next regular meeting of the Board Mr. Hudson's salary be at the rate of seventy-five ($75) dollars per month.

On motion of Prof. Fall, the by-laws of the Board were changed to read that the regular meetings shall be held on the second Friday of Jan., April, July and October, of each year, at 3:30 p. m.

On motion of Doctor Granger, the Board voted to continue Mr. Reed as clerk in the office at sixty-five ($65) dollars per month.

Applications for clerkships from Mr. James G. McHenry, Miss Pearl Field, Roy C. Bristol, Dr. J. B. Curtis, C. C. McDermid, and a number of others, were presented by the secretary; but the Board decided that such applications would not be considered until the report of the committee to draft plans for a civil service system in the office, or at least until the next regular meeting of the Board.

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* Hektograph No. 1612.

† Hektograph No. 1626.

‡ The correspondence relative to bacteriological diagnoses and restriction of diphtheria in Detroit will be found in connection with the article "Diphtheria in Michigan in 1895" printed in this Report.

The subject of a small printing press for the office for printing bulletins, etc., now hektographed, was presented by the secretary, and referred to a committee consisting of the president and secretary, with power to act.

By request of Prof. Frank Kedzie of the Agricultural College, Doctor Baker presented to the Board the question of a "Systematic Study of Natural Waters of Michigan Streams and Wells," including a determination of the amount of chlorine, and organic matter in the streams above and below cities, and the pathogenic bacteria in the waters. This question was presented in the form of a written communication from Doctor Baker.*

The subject was discussed somewhat, and referred to the Committee on Water-Supplies, Prof. Fall, with a request that he correspond with Prof. Kedzie, in order that the work be commenced as soon as practicable.

The secretary presented the question of this Board recommending an inexpensive and efficient deodorizer and disinfectant. The subject was presented by the following statement:—

"Prof. F. S. Kedzie of the State Agricultural College, suggests the following solution as a deodorizer, cleanser and disinfectant, for water-closets, urinals, stationary wash bowls, porcelain bath tubs, slop hoppers, kitchen sinks, etc:—

"Chlorinated lime, one pound; sal-soda, four pounds; water, two gallons; let stand until the sediment settles, use the clear solution, keep it in earthen jugs, glass bottles or jars.

"This is almost the same as what is known as Labarraque's solution, but easily and economically prepared."

The secretary presented a letter (dated Dec. 23, 1895) from Doctor Frederick A. Jewett, medical expert, showing his experience and clinical records with small-pox antitoxin in the Kingston Avenue Hospital, Brooklyn, N. Y.

The data were thought to be of considerable interest.

Mention was made of a paper by President Wells, read before the Twentieth Century Club of Detroit, on "Women as Conservators of Public Health.†

On motion of Prof. Fall the Board voted to request President Wells to permit the publication of his paper in the annual report of this Board.†

The secretary read a letter (dated Jan. 8, 1896) from Doctor Chrouch of Shaftsburg, relative to cases of consumption, showing one way of that disease being spread by disguising the cause of sickness in certain instances, and illustrating some of the difficulties met with in the restriction of consumption.

On motion of Judge McAlvay the Board adjourned at 4:20 p. m.

SPECIAL MEETING AT LANSING, FEB. 14, 1896.

A special meeting of the State Board of Health had been called for the purpose of examining plans and specifications for a proposed new cottage dormitory at the State Industrial School for Boys at Lansing, and a proposed new building at the Asylum for Dangerous and Criminal Insane, at Ionia, and for the transaction of such other business as might properly come before the Board.

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* This communication by Doctor Baker will be found printed on subsequent pages of this Report.

† President Wells' paper is printed on subsequent pages of this Report.

The meeting was called to order at 3:30 p. m.; no quorum being present. President Wells, Judge McAlvay and Secretary Baker were present and while waiting for other members to come, looked over the plans and specifications for the proposed new building at the Ionia Asylum. Medical Superintendent Dr. O. R. Long explained the plans and answered questions asked by members of this Board.

At 5:10 Prof. Fall came in, making a quorum. The meeting was called to order by President Wells; Judge McAlvay, Prof. Fall and Secretary Baker were the other members present.

The plans and specifications for the proposed new cottage dormitory at the State Industrial School for Boys were next examined. They were explained by Hon. William Donovan, member of the Board of Control of that State Institution, and architect A. E. Bowd, Hon. I. T. Sayre, another member of the Board of Control of the Industrial School, came in for a few minutes to meet the members of this Board.

After the examination of the plans and specifications was completed, the Board was left alone to discuss the subject, and take action. The plans and specifications for each building were again gone over, and a number of recommendations wére made regarding each building.

On motion of Prof. Fall the recommendations made with regard to the plans and specifications for the proposed new building at the State Industrial School for Boys, at Lansing, were adopted.

[The action of the Board will be found printed on pages xiv–xv of this Report.]

On motion of Judge McAlvay the recommendations made with regard to the plans and specifications for the proposed new building at the Asylum for Dangerous and Criminal Insane at Ionia, were adopted.

[The action of the Board will be found printed on pages xiii–xiv of this Report.]

State Board of Health Vouchers numbers 2656 and 2668 to 2680, inclusive, were allowed.

On motion of Dr. Baker, the proposed six-page leaflet [229] "Restriction and Prevention of Whooping-Cough" was ordered printed to the number of 10,000 copies, subject to the editorship of the secretary, and a copy being sent to each member, not present, for his approval.*

The secretary presented the following questions which he thought should be discussed at the next meeting of the National Conference of State Boards of Health:—

1. Is it not possible to have uniformity of laws and rules for the transportation of corpses?

2. Does not sanitary science provide sufficient knowledge and skill to transport a corpse dead of any disease in such a manner as to be safe to the public?

3 Is it not detrimental to the interest of public health and safety to "absolutely forbid" the transportation of any corpse dead of any disease? Is it not likely that such regulations will be avoided? Is it not better to provide proper regulations, which shall be enforced?

The members thought the questions appropriate. On motion, the Board approved the questions.

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* Circular No. [229.] "Restriction and Prevention of Whooping-Cough" is reproduced in this Report

Secretary Baker read a letter which he had received from the Prosecuting Attorney of Wayne Co., in which that officer recommended that the subject of the refusal of the health officer of Detroit to make reports be placed before the police justice of that city; and if that officer would issue a warrant, then he would prosecute.

Judge McAlvay mentioned that he believed the Supreme Court should be asked for a mandamus. He believed that the proper and speedy remedy. He also offered to make the applications if the Board wished him to do so.

On motion of Judge McAlvay 20,000 copies of each of the following named leaflets were ordered printed, subject to the editorship of the secretary.

[106.] "The Restriction and Prevention of Diphtheria."
[175.] "The Restriction and Prevention of Consumption."
[176.] "The Restriction and Prevention of Measles."

On motion of Prof. Fall the Board adjourned, at 7:30 p. m.

SPECIAL MEETING AT LANSING, APRIL 10, 1896.

In accordance with a call by the president, the State Board of Health met in special meeting at Lansing, April 10, 1896, at 2:15 p. m., for the examination of the plans and specifications for a proposed new Cottage Dormitory for the violent insane, and for a proposed Infirmary at the U. P. Hospital for the Insane at Newberry, Michigan.

The members present when the meeting was called to order were: Hon. Frank Wells, president, Prof. Delos Fall, Judge Aaron V. McAlvay, and Doctor Henry B. Baker, secretary. Doctor George H. Granger, came in at 3:00 p. m., and Doctor Samuel G. Milner came in at 3:45 and took their seats as members of the Board.

After careful consideration, on motion of Judge McAlvay, a number of recommendations were adopted by the Board. With the exceptions indicated by these recommendations, the plans and specifications were approved, so far as this Board is required by law to examine and pass an opinion upon them.

[The action of the Board in connection with these plans and specifications is printed on pages xv–xvi of this Report.]

On motion of Doctor Granger, the Board adjourned its special meeting at 4:25 p. m.

REGULAR MEETING AT LANSING, APRIL 10, 1896.

The meeting was called to order by the president, Hon. Frank Wells, and the following named other members were present: Prof. Delos Fall, Doctor Samuel G. Milner, Doctor George H. Granger, Judge Aaron V. McAlvay and Doctor Henry B. Baker, secretary.

The minutes of the last (Jan. 10) regular meeting were read and approved by the Board.

The minutes of the special meeting Feb. 14, 1896, were read by the secretary and approved by the Board.

State Board of Health vouchers numbers 2656 and 2668–2680, inclusive, were allowed.

There was some question regarding the allowance of the bills presented by the American Express Co., the U. S. Express Co., and by Robert Smith & Co. Considerable portions of these bills were charges for printing, binding and express for the leaflets sent to school teachers and others in accordance with Act 146, laws of 1895. The question arose whether or not this Board was expected to pay for such expenses incurred under this act which made no provision for appropriation. It was thought that these expenses should be allowed by the Board of State Auditors as "claims against the State not otherwise provided for by law." However, these bills for printing, binding and express were allowed, inasmuch as the items had been ordered by the office of the Board, and the Board can itself look to the Board of State Auditors to reimburse the amounts.

On motion of Judge McAlvay, the Board voted to request the secretary to separate, itemize, classify and present to the Board of State Auditors for allowance at their next meeting the expenses already incurred and defrayed by the State Board of Health under Act 146, laws of 1895.

Under the head of brief announcements by members, Judge McAlvay said he would make a report of the effort to obtain an annual report from the health officer of Detroit; Prof. Fall said that he would present the question whether the Board wished him to continue his work in connection with the examination of spring waters; the secretary read a list of some twenty items of business which he wished to bring before the Board if there were opportunity.

Judge McAlvay made a report relative to his work in connection with securing an annual report from the health officer of Detroit. He said the secretary had already informed the members by hektograph and otherwise about what action had been taken. Judge McAlvay said he first wrote to Attorney General Maynard stating the case and asked him whether the petition for the mandamus would be prepared in his office or whether the attorney general would appoint him (Judge McAlvay) to represent the Board. The attorney general replied that he would see Doctor Duffield in Detroit in a few days. He saw Doctor Duffield who said he would act according to instructions from his Board. The attorney general then interviewed members of the Detroit Board of Health who agreed that the work should be done and the report made in accordance with the law. Judge McAlvay understood that the report was now being made.

Secretary Baker read a letter which he had received from health officer Duffield stating that the annual report would be completed in about two weeks.

[Health officer Duffield's incomplete report was received May 1, 1896; but was useless because it lacked the data for the time between Jan. 1 and Feb. 23, 1895. Up to the time of making this Report (Sept., 1896) the annual report had not been completed.]

The subject of other health officers and clerks not having made their annual report was discussed. Secretary Baker said that the law requiring reports to health officers and clerks was amended by the last legislature, so that all reports of "diseases dangerous to the public health," are made direct to the health officer, thus relieving the clerk from further duty on that subject. Doctor Baker thought it not necessary to ask for annual reports of clerks after the year 1895, and not as important for 1895 as for previous years, because the new law took effect August 30, 1895.

On motion of Judge McAlvay, the secretary was directed to request health officers from whom no annual report had been received for the year

1895, to make such reports immediately, in accordance with the State law or proceedings would be commenced against such delinquent officers.

On motion of Doctor Granger, the Board took a recess from 5:50 to 7:00 p. m.

Evening Session, 7:10 p. m.

The meeting was called to order by the president, and the same members were present at the evening session as were present at the afternoon session.

The secretary presented his report of work in the office during the first quarter of 1896. The report was received and placed on file.

Secretary Baker presented a special report relative to the distribution of leaflets, diagrams, etc., to teachers, school officers and others. The report was received and placed on file.*

The secretary mentioned that he had recently (April 8) received a communication from the Governor of Michigan, which communication is incorporated in the following letter which was sent to the members of the Board previous to this meeting. The letter to the members reads as follows:—

STATE BOARD OF HEALTH, MICHIGAN,
OFFICE OF THE SECRETARY,
Lansing, April 8, 1896.

To the President and Members of the State Board of Health:

GENTLEMEN:—The following is a communication just received at this office from Hon. John T. Rich, Governor of Michigan:—

"In view of the fact that tuberculosis has been discovered in the herds belonging to several of the State Institutions, and in several herds outside, and in view of the dangers likely to result from using diseased milk in our State Institutions, especially in asylums for the insane, I am led to ask your Board to investigate the practicability and the efficiency of providing for the pasteurization or sterilization of milk used by these institutions."

In conversation, Governor Rich had previously suggested that a circular be issued to State Institutions.

At the meeting April 10, I trust that a proposition can be discussed for such a circular commending to the consideration of the stewards, superintendents, or other proper officials the subject of sterilization of the milk used by the insane, by the prisoners, and by the pupils in the several State Schools and institutions. The circular to set forth the liability of unsterilized milk to contain the Bacillus tuberculosis—the specific cause of consumption. The Governor suggests that where institutions have a steam plant, as most of them have, "Pasteurization" of all the milk used would not involve much expense. This method of sterilizing the milk might do away with the objection which has been raised to boiled milk that it is not easily digested, especially by children. None of the State Institutions, however, except possibly the State School at Coldwater, has children young enough likely to be seriously interfered with by the use of boiled milk.

Although it is not claimed that this is the most frequent mode by which consumption is spread, yet that the disease is spread by means of infected milk is no longer questioned. Recent experiments have demonstrated that a small quantity of milk infected with the Bacillus tuberculosis mixed with a large quantity of uninfected milk is still capable of causing death from tuberculosis in animals into which it has been injected. Experiments have proved, also, that cows supplying milk and not suspected to be tuberculous have yet been demonstrated to be tuberculous and to yield milk infected with that disease.

It may be objected to the proposed sterilization that it is unnecessary if every animal supplying milk to such an institution has been tested by the tuberculin test and found not to be tuberculous. But such tests are not likely to be made oftener than once in a year or possibly six months, therefore an animal may become tuberculous and remain so for a few months and supply dangerous milk which is used unsuspectingly. If Pasteurization of the milk is constantly practiced, the danger from tuberculosis from this source will be done away with.

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* [This Report by the Secretary is printed in subsequent pages of this Report.]

Very respectfully,

HENRY B. BAKER,

Secretary.

Secretary Baker read the following clipping from the *Detroit Evening News*, of April 6, 1896:—

"Lansing, Mich.—April 3—President Hinds, of the Live Stock Sanitary Commission, has called the attention of Governor Rich to the remarkable case which transpired in Montcalm County several years ago. A farmer lost two head of cattle from tuberculosis. The disease later developed in the farmer's family, consisting of six members, all of whom, together with two attendants, have since died of the disease. Governor Rich will collect the details of the case, and turn the matter over to the State Board of Health for scientific investigation."*

Doctor Baker mentioned that the art of the Pasteurization of Milk was being taught at the Agricultural Experiment Station, at Madison, Wis. He said if necessary some person might be sent to this school for instruction who could return and teach the subject in this State. He also mentioned that there was a firm at Northville which has been Pasteurizing large quantities of milk for sale in Detroit; also that Mr. Grosvenor of Monroe sterilized milk for the trade.

On motion of Doctor Granger, the secretary was directed to address a communication to the proper officer of each State Institution, which shall comply with the Governor's suggestion. The communication should call attention to the prevalence of consumption in animals and in man, the danger of the disease being spread from animal to man by means of the milk supply, and should suggest a plan whereby each institution could Pasteurize or in some way sterilize all the milk used.

While the Board recognized the fact that the sterlization of the milk supply of State institutions was of importance, they also thought that it was of very much greater importance that the milk supplies of cities and villages be sterilized so as to make the milk free from the danger of tuberculosis and typhoid fever.

On motion of Mr. Wells, the Board voted to direct the secretary to prepare for publication and general distribution a forcible statement of the dangers from infected milk, and of methods for the sterlization of public and domestic milk supplies.

The secretary presented the question whether the Board would reconsider the action by which George E. Willitts' paper on "Achievements of Sanitation" was ordered to be printed in the Annual Report of this Board. The paper has been read at two Sanitary Conventions, published in the proceedings of one of them, and reprinted in pamphlet form.

On motion of Doctor Baker, the Board reconsidered the action by which Mr. Willitts' paper was ordered printed in the Annual Report.

On motion of Prof. Fall, the Board then laid the question on the table.

The secretary presented letters he had received from the president of the Michigan Engineering Society—Mr. George L. Wells. These letters proposed that there should be printed in the annual report of the State Board of Health two papers read before the last meeting of that Society.

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* [Later this newspaper item could not be substantiated, as regards the orgin of the disease being cattle. There is probably no doubt that the disease can be traced as having spread from one person to another. The disease seems to exist in Vestaburg, Montcalm Co. in an epidemic form.]

One paper "Modern Methods of Supplying Cities with Pure Water" by Allan Hazen, C. E.; the other "Water Purification" by Gardner S. Williams.

On motion of Doctor Baker, the subject of printing these two papers in the Annual Report was referred to Prof. Fall, the committee on "Water Supply, including purification of sewage-contaminated water," with request for a report at the next meeting of this Board.

Secretary Baker read a letter from Doctor I. S. Morris, relative to a sanitary convention or public meeting at Belding. The secretary mentioned that he had written Doctor Morris that he should make it known by petition signed by leading business men, physicians, lawyers, and others that it was the wish of the people of Belding that such a convention should be held, and let the State Board know that every effort would be made to make the convention a success. Although it has been two or three weeks since this reply went to Doctor Morris, no response had yet been received.

On motion of Judge McAlvay, the Board voted that, if proper request be made, accompanied by the statement that the expenses of the members in holding such meeting would be paid, the secretary should make arrangements for a sanitary convention at Belding.

On motion of Doctor Baker, the secretary was directed to write to the Director of the State Laboratory of Hygiene, at Ann Arbor, and ascertain when would be most convenient for the Director and his assistants to aid in holding another conference of Michigan health officers.

The secretary mentioned that he had listened to a very interesting paper "A Plea for Teaching Sanitary Science in the Schools," by Prof Delos Fall, before a recent meeting of the Michigan School Master's Club at Ann Arbor.

On motion of Secretary Baker, the Board voted to request Prof. Fall's permission to print his paper read before the Michigan School Master's Club, in the annual report of this Board. [This paper is printed in this Report.]

On motion of Judge McAlvay, the Board voted to print in the Annual Report the paper read before the Bay County Medical Society recently, by Doctor Baker entitled "The State Board of Health—A finger on the public pulse of two and one-quarter millions of people". [This paper is printed in this report.]

At this time (8:05 p. m.,) Doctor Milner left to catch his train for Grand Rapids.

The secretary presented the following memorial which had been prepared during the quarter, in compliance with a request by Dr. A. G. Young, secretary of the Maine State Board of Health, and had been sent to the members in Congress from Michigan:

March 18, 1896.

To the Honorable, the Senators and Congressmen from Michigan, Washington, D. C.

GENTLEMEN:—We the officers of the Michigan State Board of Health having in mind especially the protection of the citizens of Michigan from danger of contracting communicable diseases from immigrants and immigrants' baggage passing through the port at Portland, Maine, to which port many immigrants bound for Michigan and beyond sometimes come, especially in winter when the St. Lawrence river is not navigable, and understanding that it is the desire of the local and of the State health authorities of Maine that a National quarantine station be established at the port of Portland, Maine, do most respectfully urge the honorable the senators and representatives in Congress from Michigan to use their influence to bring about this desired improvement.

We believe that a frequently-changing municipal government, with its varying ideas of the expediency of making expenditures which are more largely for the protection of citizens of other parts of this country than of the citizens of Maine, is not equal to the task of the continuous maintenance of a quarantine station which shall meet the requirements for safety to the health of our people.

We believe that the interests of the whole country would be much better served if there were at Portland, Maine, a quarantine station under the control of the National Government.

Again expressing a desire that you use your influence in bringing about this desired change,

We remain, very respectfully,

FRANK WELLS,
President.
HENRY B. BAKER,
Secretary.

The secretary reported that in response to the above memorial, several courteous replies had been received from Congressmen from Michigan.

It was announced that the next meeting of the National Conference of State Boards of Health would be in Chicago, June 10, 1896.

On motion of Doctor Baker, it was voted that any member who could attend the meeting should act as delegate from this Board, no expense to be incurred to be met by this Board.*

On motion of Doctor Baker, the Board voted that any member who could attend the next meeting of the Michigan State Medical Society, at Mt. Clemens, June 4–5, 1896, should act as delegate from this Board, no expense to this Board to be incurred.†

The secretary read a clipping from the "Information" of April 4, 1896, published by the Trans-Atlantic Pub. Co., of New York City. The clipping stated that the isolation of consumptives would be enforced at Alameda, California. Room isolation is contemplated, the family being required to give the patient a room to himself, and to observe such rules regarding sanitation as will minimize the danger of communicating the disease to others.

The secretary read extracts from his special report on the distribution of the leaflets to school teachers, and others. Prof. Fall suggested that a synopsis of this special report be prepared for publication in the "Moderator" or other paper or journal.

The secretary presented the applications of James McHenry, Miss Savage and Miss Violet A. Mode, for clerkships in this office. It did not seem to be the wish of the Board to consider any applications, so further presentation of applications was discontinued.

On the question whether more clerks were needed, Doctor Granger took the opportunity to say "I have never said anything about it, but I have been waiting for some time to get an opportunity to say that I do not believe the statistical work the office is doing, is reliable." He was then questioned as to what criticism he had to make of the statistical work. He said that the office claimed to know all the deaths from dangerous diseases, when he knew that they did not. He knew of several cases of typhoid fever in his own city which for four weeks were not reported in the weekly bulletin issued by the Secretary of the State Board.

Prof. Fall, Judge McAlvay and Doctor Baker, explained that the office did not claim to have knowledge of all cases which occur, that it does not deal with facts which the office does not have, but the statistical work of the office is based on those facts which are actually reported to the office;

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* [Dr. Baker attended the meeting at his own expense.]

† [Dr. Mason W. Gray attended the meeting of the State Medical Society at his own expense, and his report as delegate is printed in this Annual Report.]

and that on several subjects the facts obtained are sufficiently numerous to supply representative data and thus to settle the question.

In the course of the discussion, Prof. Fall instanced the contagious-disease statistics relative to outbreaks of diphtheria and scarlet fever in Michigan, whereby it has been proved by the experience in hundreds of instances in each of several years that the cases and deaths from these diseases are very much less in those outbreaks in which isolation and disinfection were enforced than in those in which these measures were not enforced. Not all outbreaks are reported, but it is perfectly easy to divide those which are reported into two classes—the "neglected" and the "enforced." The fact that the statistics show nearly the same results year after year for nearly ten years, seems to demonstrate that in each year there are a sufficient number of instances included to do away with most of the accidental inaccuracies, and that the true mean is approximately shown in every year; in other words that these statistics are reliable.

Secretary Baker referred to pages cxxxix–cxliii of the annual report of this Board for 1892 where it is mathematically demonstrated that, so far as relates to two series of statistics (relative to atmospheric temperature, and relative to sickness in Michigan from pneumonia), the common idea that all the statistics possible must be collected in order to approach the truth, is entirely fallacious, and that from even one reliable observer, supplied with an "instrument of precision," can be learned the monthly mean temperature of Michigan sufficiently exact for practical use.

On motion of Judge McAlvay, the Board adjourned at 10:20 p. m.

QUARTERLY REPORTS OF WORK IN THE OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH DURING THE FISCAL YEAR ENDING JUNE 30, 1896.

For each regular meeting of the State Board of Health the Secretary prepares a report of work in the office during the preceding quarter. The abstracts of these might be published with the proceedings of the several meetings; but are collected and published here in order to bring the reports of work in the office all together. In the report of work for the last quarter of 1895, on subsequent pages, is a summary relative to communicable diseases in the calendar year 1895. Following these quarterly reports will be found a general report for the fiscal year 1896.

SECRETARY'S REPORT OF DANGEROUS COMMUNICABLE DISEASES, OF WORK DONE IN THE OFFICE OF THE STATE BOARD OF HEALTH, AND OF THE CONDITION OF HEALTH GENERALLY IN MICHIGAN DURING THE QUARTER ENDING SEPTEMBER 30, 1895.

Dangerous Communicable Diseases.

The number of reports of outbreaks of dangerous communicable diseases in Michigan, received from all sources and filed, and the corresponding number concerning which action was taken by this office, during the quarter, are as follows: for diphtheria, 83; for scarlet fever, 99; for typhoid and typho-malarial fever, 260; for measles, 30; for whooping-cough, 45; for small-pox, 4; and for consumption, 67. Total for the seven diseases, 588.

The number of communications relative to dangerous communicable diseases, received and placed on file during the quarter, was 2,025.

Relative to dangerous communicable diseases, letters, written cards, and demands for weekly and final reports on cards, or in the form of the circular letter, were sent out during the quarter to the number of 1,501.

The "final" reports, of outbreaks ended, received and filed during the quarter were: for diphtheria, 54; scarlet fever, 84; typhoid and typho-malarial fever, 58; measles, 50; whooping-cough, 11; small-pox, 3; consumption, 5. Total for the seven diseases 265.

During the quarter, the local columns of 1,130 newspapers, have been looked over for reports of occurrence of communicable diseases. (This work is done by the clerk who acts as messenger and janitor, in the intervals of his performance of other duties.) This has resulted in giving this office information of the alleged occurrence of 2 outbreaks of diphtheria, 3 outbreaks of scarlet fever, 69 outbreaks of typhoid and typho-malarial fever, 1 outbreak of measles, 3 outbreaks of whooping-cough and 15 cases of consumption. To what extent the reports of these alleged outbreaks were verified, is shown in the accompanying table:

TABLE 1.—THIRD QUARTER OF 1895.—*Exhibiting the number of outbreaks of Diphtheria, Scarlet fever, Typhoid fever, Measles, Whooping-cough, Small-pox, and Consumption, from July 1, to September 30, 1895, of which notice was received at the office of the Michigan State Board of Health; the per cent of reports, information concerning which was received through the Newspapers; the per cent of newspaper reports which were confirmed by the health officer; the per cent of newspaper reports which were denied by the health officer; and the per cent relative to which no reply was received from the health officer.*

Diseases.	Reports from *all* sources, July 1, to September 30, 1895.	Per cent of all reports which were obtained from the newspapers.	Per cent of newspaper reports which were confirmed by the health officer.	Per cent of newspaper reports which were denied by the health officer.	Per cent of newspaper reports to which the health officer made no reply to notice sent from this office.*
Diphtheria	83	2	50	0	50
Scarlet fever	99	3	67	0	33
Typhoid fever	260	27	20	26	54
Measles	30	3	0	0	100
Whooping-cough	45	7	33	0	67
Small-pox	4	0	0	0	0
Consumption	67	22	73	7	20
Averages for the seven diseases.		16	31	21	48

* In these instances, the health officers being thus proved to be negligent, it is quite possible that the newspaper reports are correct.

Small-pox in Michigan in the third quarter of 1895, and its present status.

Four new outbreaks of small-pox were reported during the quarter. These occurred in Charleston township, Kalamazoo Co.; Bedford township, Calhoun Co.; Marshall city and Battle Creek township, Calhoun Co. A final report of the outbreak at Charleston township has been received. The case at Marshall died but no final report of this outbreak has yet reached this office at this date (October 1, 1895). Final reports have been received from the outbreaks in Olivet village and Danby township which began during the second quarter of 1895.

At this date (October 1, 1895) small-pox is still present at Detroit, Battle Creek, Bedford township and Battle Creek township.

The outbreak which began in Detroit in May, 1894, still continues. During the quarter ending September 30, 1895, there have occurred in that city 20 new cases and 2 deaths, which, with the 17 cases that were still sick at the close of the year, 1894, and the 108 cases, and 33 deaths which occurred during the first six months of 1895, make a total of 145 cases and 35 deaths during the nine months ending September 30, 1895.

During the nine months of 1895 there have occurred in the city of Detroit 128 new cases and 35 deaths; at the close of this quarter 11 cases were still sick. (From the beginning of the outbreak in May, 1894, up to October 1, 1895, there have occurred in the city of Detroit 268 cases and 69 deaths.)

The outbreak which began in Battle Creek in June, 1895, still continues. During the quarter ending September 30, 1885, there have occurred in that city 14 new cases and 3 deaths, which with the 3 cases which occurred during the second quarter of 1895, make a total of 17 cases and 3 deaths which have occurred in the city of Battle Creek.

In the four new outbreaks of small-pox which occurred during the quarter ending September 30, 1895, there have occurred 6 cases and 3 deaths.

During the nine months ending September 30, 1895, including the 17 cases which were still sick, in Detroit, at the close of the year 1894, there have occurred in the State 195 cases and 45 deaths.

In 13 out of the 15 outbreaks, relative to which final reports have been received, during the nine months ending September 30, 1895, the infection was restricted to the one house in which it first occurred. The two exceptions to this rule were Highland Park, Wayne County, and the city of Battle Creek. This statement does not include the city of Detroit, as the outbreak in that city still continues, and since the outbreak began in May, 1894, at least fifty houses in that city have been infected and probably a great many more.

This subject of small-pox in Michigan is important now, because this is the time of the year when small-pox usually begins to spread, reaching its maximum about May. For all persons not having recently had the small-pox or not successfully vaccinated or revaccinated within five years, now is a good time to be vaccinated. No person need have small-pox if he will keep himself protected by successful vaccination.

Compiling, Editing, Proof-Reading, Printing, etc.

The compilation of reports from all sources relative to scarlet fever in Michigan in 1893, has been completed and proved; the compilation of reports relative to diphtheria in Michigan in 1893 has been proved; and the compilation of reports relative to typhoid fever in Michigan in 1893, has been advanced nearly to completion. Owing to a change in the method of compiling, the compilation of material relative to diphtheria in Michigan in 1893, was revised. (The foregoing mentioned work is for the Report for 1894.) The material for the "First Part" of the Annual Report for 1893 has been made ready and sent to the printer. (This work is for the Annual Report for 1893.) The compilation on the "Statistical Study of Sickness in Michigan in 1893" for the Report for 1894, has been completed; and the compilation of the weekly card-reports of sickness during the year 1894 for the Report for 1895, has been commenced.

The facts relative to typhoid fever, diphtheria, scarlet fever and measles have been compiled from the annual reports of health officers and clerks of townships, cities and villages in Michigan for the year 1894.

Proof has been read for the Annual Report for 1893 on subjects as follows:—diphtheria, scarlet fever, membraneous croup, typhoid fever, measles, alleged typhus fever, consumption, cholera (alleged), cholera infantum, whooping cough, erysipelas, puerperal fever, rōtheln, small-pox, mumps, chicken-pox, alleged anthrax, glanders, alleged hydrophobia, alleged poisoning by meat and canned fruit, injuries and loss of life and property from burning by kerosene oil and gasoline, and alleged nuisances in Michigan in 1892. In all about 300 pages of "copy." Proof has also been read on the "Part I" of the Report for 1893; about 255 pages of "copy."

The editorial work on the annual compilation relative to diphtheria in Michigan in 1893, for the Report for 1894, has been well advanced toward completion; and most of the preparatory work necessary on the compilation relative to scarlet fever in Michigan in 1893, for the Report for 1894, has been done; and the compilation relative to alleged nuisances in Michigan in 1893, for the Report for 1894, has been made nearly ready for the printer.

The preparation of the material on "Communicable Diseases in Michigan in 1893," for the Report for 1894, has been delayed in consequence of amendments of the methods of compilation.

The index for the Annual Report for 1893, so far as was practicable, has been made and proved.

Work on Meteorology.

The regular tri-daily meteorological observations have been continued at this office, and for each week and month during the quarter a summary has been made for use in this office in connection with sickness statistics. The monthly summary was sent to the Local Forecast Official at Detroit; to the Director of the Michigan Weather Service, at Lansing, and to the Chief of the U. S. Weather Bureau at Washington, D. C., except for the month of September, when it was sent only to the Director of the Michigan Weather Service, at Lansing, for his use, and by him it is to be forwarded to the Chief of the U. S. Weather Bureau, at Washington, D. C.

Diagrams were drawn as follows: (1) Deaths in Michigan, 10 years, 1884-93, from the principal contagious diseases, etc. (size 4-¼ by 1 inch; and (2) Plan of public school building—ventilating and steam heating, at Almont, Michigan, to accompany an answer to a letter from the health officer at Almont.

The article on meteorology for the year 1893 was completed, and is in the hands of the printer. The compilation of the data relative to meteorology in Michigan in 1894 is near completion.

Ozone test-paper was sent to each of 16 meteorological observers in Michigan.

Hektograph Work.

Hektograph work to the number of 1,707 pages has been made, of which about 550 pages were relative to abstracts of the proceedings of the regular quarterly meeting of this Board July 12, 1895; 125 pages were relative to the small-pox situation in Michigan since Jan. 1, 1895; other pages were relative to the removal of dead bodies, resolutions relative to sore throats, "Michigan Work Appreciated.", etc., etc.

Accessions to the Library, Card-Cataloguing, etc.

About 139 books and pamphlets, and some 325 numbers of journals (weeklies, monthlies, and quarterlies) have been received and entered in the library of the Board.

Work has been done in connection with the arrangement and placing of new accessions to library.

The work on the card-catalogue of the library has been continued to a limited extent.

Work in connection with the financial and other accounts of the office has been continued.

Distribution of Publications, etc.

Copies of the Annual Report for 1892, to the number of 2,600 were sent to:—Secretaries of other State Boards of Health, to State medical societies, correspondents, meteorological observers, meteorological exchanges, members of State Board of Corrections and Charities, superintendents of State institutions, health officers and sanitarians of other States, libraries, health officers, clerks and presidents of cities and villages, health officers of townships, educators at Ann Arbor, and sanitarians in this and other States.

The pamphlet proceedings of the sanitary convention held at Union City, and that of the one held at Charlotte, and the proceedings of the second Annual Conference of Michigan Health Officers, have been sent to: Correspondents, libraries, health officers and sanitarians of other States, and secretaries of State medical societies. The proceedings of the Charlotte convention has been sent to secretaries of other State Boards of Health, meteorological observers, meteorological exchanges. (The report of the legislative investigation of the State Board of Health during the recent session, was sent to the above mentioned institutions, officials, and individuals.) The proceedings of the Charlotte convention, a copy of the abstract of the April meeting of the Board, and a copy of the circular No. [226] relative to the modes of spread and the best methods of the restriction and prevention of the dangerous communicable diseases, were sent to secretaries of other State Boards of Health. The proceedings of the Charlotte Convention, the abstract of the April meeting, the pamphlet reprint No. [423] relative to "Principal Meteorological Conditions in Michigan in 1892" and a copy of the above-mentioned circular [No. 226] were sent to meteorological observers and meteorological exchanges. The pamphlet proceedings of the January meeting, and the pamphlet proceedings of the April meeting of the Board, and the circular No. [226] were sent to the correspondents of the office.

The abstract of the Oct., Jan. and April meetings of the Board, and the circular No. [226] were sent to health officers and sanitarians of other States, and libraries of this and other States.

The proceedings of the Charlotte convention, the abstract of proceedings of the April meeting, Circular No. [226] and Circular No. [227] relative to the modes of spread and the best methods of restriction and prevention of the dangerous diseases, were sent to the health officers of cities and villages of Michigan.

About 5,000 copies of Circular No. [227], about 9,000 copies of Circular No. [226], and 200 copies of a reprint No. [437] abstract of a paper by Prof. Fall relative to "Better Methods of Teaching Hygiene" in the public schools, were given to the superintendent of public instruction for distritbution in Michigan, to teachers, school officers, etc. in accordance with Ac-146, laws of 1895.

The proceedings of the Charlotte convention was sent to each of the participants and officers of that convention.

A copy of each of the three circulars (Nos. 226, 227 and 437) relating to teaching in the public schools the modes of spread, and the best methods for the restriction of dangerous communicable diseases, was sent to all presidents, superintendents and libraries of State Schools and colleges in Michigan, and to the deans of the departments of medicine, biology and physical science in the University of Michigan; 14 of each of the three above-mentioned leaflets were sent to the State Industrial School for Girls; 14 copies of each were sent to the State Industrial School for Boys; 13 copies of each were sent to the Superintendent of the Michigan School for the Deaf; and 7 copies of each to the Superintendent of the State Public School at Coldwater.

The reprint [No. 430] "Time of Greatest Prevalence of Each Disease in Michigan in 1892" was sent to each of 153 observers or physicians who made to this office, weekly card reports, tabulated in that article.

There have been returned to this office about 100 additional names of health officers of cities, villages and townships, their names recorded in the books of the office, the return placed on file, and to each health officer and to the person making the return were sent the usual supply of pamphlets, leaflets, blanks, etc.

About the usual numbers of pamphlets on the restriction and prevention of the different dangerous communicable diseases were sent to the health officers of localities in which dangerous diseases have been reported. It was at the same time requested of these health officers that the pamphlets be distributed to the *neighbors of the person sick with such a disease* and to such other persons as the pamphlets would be likely to benefit, or benefit the public health.

In response to special requests of sanitarians in this and other States, copies of annual reports, proceedings of sanitary conventions, proceedings of meetings of the board, and pamphlets on the restriction and prevention of the dangerous communicable diseases, have been sent where it was thought likely to benefit the public-health interests.

The usual record of distribution of the publications has been kept.

Printing of Pamphlets, Leaflets, Diagrams, etc.

The eight-page leaflet [No. 176] "Restriction and Prevention of Measles" has been considerably revised, and an edition of 10,000 copies printed.

A two-page leaflet reprint [No. 437] abstract of a paper by Prof. Fall, on "Better Methods of Teaching Hygiene," was reprinted from the Proceedings of the Charlotte sanitary convention to the number of 1,000 copies, and widely distributed to teachers and other persons.

The two-page leaflet diagram with "Isolation and Disinfection Restricted Diphtheria in Michigan in 1891" on one side, and "Isolation and Disinfection Restricted Diphtheria in Michigan in 1892" on the other side, has been printed to the number of 2,000 copies.

The two-page diagrammatic leaflet with "Isolation and Disinfection Restricted Typhoid Fever in 1891" on one side, and "Isolation and Disinfection Restricted Typhoid Fever in Michigan in 1892" on the other side, has been printed to the number of 2,000 copies.

The two-page diagrammatic leaflet with "Deaths in Michigan, 10 years, 1884–93," on one side, and "Pathogenic Micro-Organisms,—'Germs' of Diseases" on the other side, has been reprinted to the number of 2,000 copies.

The two-page diagrammatic leaflet with "Isolation and Disinfection Restricted Scarlet Fever and Diphtheria in Michigan during the 5 years, 1886–90," on one side, and "Lives Saved by Public Health Work" in Michigan from scarlet fever and small-pox before and since the State Board of Health has been established, and from typhoid fever before and since the State Board of Health undertook its restriction, has been reprinted to the number of 2,000 copies.

The diagram "Low Water in Wells and Sickness from Typhoid Fever in Michigan, during the 14 years, 1878 and 1880–92," and the diagram "Typhoid Fever and Sewers in Munich," have been reprinted as a two-page leaflet to the number of 2,000 copies.

"Chart I" and "Chart II" have been reprinted as a two-page leaflet to the number of 2,000 copies.

The eight-page leaflet No. [110] "Restriction and Prevention of Scarlet Fever" has been reprinted to the number of 20,000 copies.

Publication of New Record Books, Leaflets, etc.

In compliance with Act 146 laws of 1895 a four-page leaflet [No. 226] giving brief statements regarding the modes of spread and the best methods for the restriction and prevention of the dangerous communicable diseases, for use in the public schools, was approved by this Board at its last regular meeting. During this quarter, the leaflet has been printed to the number of 20,000 copies, and widely distributed to teachers, superintendents of schools, and others. This new leaflet is here reproduced as follows:—

DANGEROUS COMMUNICABLE DISEASES.

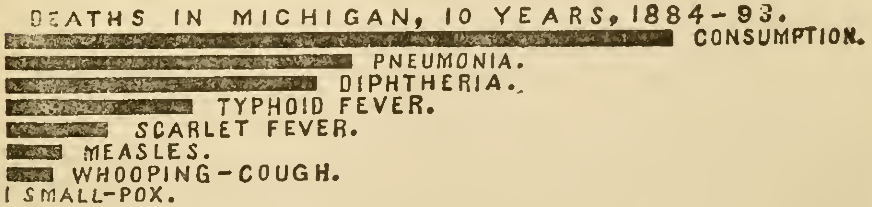
HOW SPREAD, HOW RESTRICTED AND PREVENTED.

Data and Statements Supplied to School Superintendents and Teachers by the Michigan State Board of Health, in compliance with Act No. 146, laws of 1895.*

[226.] [FIRST EDITION, JULY, 1895, 20,000; PRINTED.]

In Michigan the most dangerous communicable diseases, named in the order of their importance as causes of death, are consumption, pneumonia, influenza,† diphtheria, typhoid fever, scarlet fever, measles, whooping-cough, and small-pox.

The relative importance of these diseases is shown by the diagram below. Consumption causes many more deaths than does any other disease.



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* Section 1 of this act, requires "That there shall be taught in every year in every public school in Michigan the principal modes by which each of the dangerous communicable diseases is spread, and the best methods for the restriction and prevention of each such disease. The State Board of Health shall annually send to the public school superintendents and teachers throughout this State, printed data and statements which shall enable them to comply with this act. School boards are hereby required to direct such superintendents and teachers to give oral and blackboard instruction, using the data and statements supplied by the State Board of Health." (Section 2 provides penalties for non-compliance.)

† Up to the year 1889, influenza caused few deaths in Michigan; but in 1890, 1891, and 1892, the deaths reported from it averaged over 1,000 per year.

Principal modes by which the communicable diseases are spread.

Most of the so-called "contagious" diseases are usually spread by means of atmospheric dust of which the germs of these diseases sometimes constitute a part. Consumption, diphtheria, pneumonia, influenza, scarlet fever, measles, whooping-cough, and small-pox are usually spread in this manner. Probably these diseases are not usually caught or contracted except through some break in the skin or in the mucous membrane lining some cavity. Such breaks or ulcerations occur not infrequently in the throat at those seasons of the year when the atmosphere is what is known as "raw;" that is, when it contains the throat irritant ozone, and when it is irritating by reason of its drying effect in cold, windy weather. These diseases are apparently usually contracted by taking in the germs with the breath, through the mouth, and probably sometimes through the nose. The nose is so constructed, and so guarded by minute hairs, kept moist by the exhaled breath and by secretions, that very little dust of any kind is permitted to pass beyond the nose, so long as that organ is in its normal condition; but so much dust-laden air passes through the nose that much dust is there collected. Generally such dust contains many species of bacteria, spores, and germs, some of which are capable of causing a specific disease. For instance, the micro-organisms (pus-cocci), which cause suppuration (the formation of pus), are so generally present that any break in the skin or mucous membrane is usually followed by the formation of pus. The germs of pneumonia are quite generally distributed, so that they are sometimes found present in the noses and mouths of persons not yet suffering from pneumonia.

Because of these facts, handkerchiefs once used, are very liable to spread disease, in case any secretion from the nose has dried on so that it may be detached and form dust that may be taken in with the breath or enter any break in the skin.

Some of the chief sources of danger of contracting diseases are:

1. Dust from infected handkerchiefs. (A general rule applicable to all persons, sick and well, is that handkerchiefs should be looked upon with suspicion. They should not be used after any secretion from the nose has been permitted to dry upon them. After being used they should be put into a paper bag which may then have its top twisted shut, there to remain until put into boiling water.)
2. Dust from floors or articles upon which infected sputum or saliva has been ejected.
3. Contact with the hands of persons who cough into their hands, or who handle infected handkerchiefs or cloths into which they have spit.
4. Books, pencils, gum, drinking cups, etc., used in common.
5. Dust from rooms or clothing infected by persons having a communicable disease.
6. Possibly typhoid fever may be spread by means of dust containing the germs of that disease; but, in order that typhoid fever may occur, the germs must be swallowed or find their way to the lower part of the small intestine. This disease is usually spread by drinking-water which has been contaminated with sewage or with leachings from privies. Similar statements are true relative to cholera.

Dangerous communicable diseases, in the order of their importance, modes by which they are spread, and best methods for their restriction and prevention.

Consumption is now known to be a communicable disease. It is spread by the dust of dried sputa, and also by milk and meat of tuberculous animals. The most important measure for the restriction of consumption is the disinfection or destruction of all sputa of every consumptive person.

It is best that all persons who have a cough should carry small pieces of cloth (each just large enough to properly receive one sputum) and paraffined paper envelopes or wrappers in which the cloth, as soon as once used, may be put and securely enclosed, and, with its envelope, burned on the first opportunity.

Pneumonia is spread by a germ which is in the sputum of those who have the disease, (and of some who do not have the disease unless, possibly, after exposure to the inhalation of cold air). Care should always be taken to destroy or disinfect all sputa of those who have pneumonia.

Influenza is now believed to be spread by a germ which finds its way from infected handkerchiefs and other articles and places, into the nose, throat, and air passages of persons susceptible to this disease. The measures for its restriction are therefore obvious,—isolation and disinfection.

Diphtheria is spread by the sputa, saliva, and whatever comes from the throat and mouth of the patient, and by the dust which results from the drying of such saliva, etc. The germs of diphtheria sometimes remain in the throat weeks after apparent complete recovery. For its restriction and prevention, isolation and disinfection are the important measures,—isolation of every infected person and thing, and their complete disinfection. (See "General Directions," pages 3–4.)

Typhoid fever. Unlike typhus fever, typhoid fever is not often contracted directly from the sick person, but usually from the discharges from the bowels of the sick person. These should always be properly disinfected. Undisinfected discharges, if dried and formed into dust, may spread the disease through the air. The chief source of danger, however, is believed to be drinking water contaminated by sewage or leachings from privies, etc. The germs of typhoid fever are killed by boiling. All suspected water should be boiled.

Scarlet fever. The germ of scarlet fever is not yet identified. But that there is a germ, seems to be proved by the well known communicability of the disease from person to person. It is spread by the discharges from the nose, mouth, and throat, and probably also by the minute scales which are thrown off from the surfaces of the body. Isolation and disinfection are the measures by which this disease is restricted.

Measles is spread from person to person, directly and indirectly. Isolation and disinfection should be inforced.

Whooping-cough is a communicable disease which, in Michigan, causes more deaths than does small-pox. Whooping-cough is spread from person to person, directly and probably indirectly. Most of the following "General Directions", except perhaps those for disinfection of the discharges from the kidneys and bowels, are applicable for its restriction.

Small-pox. Small-pox is a contagious disease; it spreads by means of particles given off from the surfaces of the body. The following rules are applicable for the *restriction* of small-pox, whenever the disease occurs; but by vaccination and revaccination, small-pox may be and should be, almost wholly *prevented.* One vaccination or once having small-pox does not protect for life. Revaccination should be had once in about five years, also whenever small-pox is prevalent, and certainly immediately after one has been exposed to the disease.

Cholera is spread in much the same way as is typhoid fever. The same precaution recommended to prevent the spreading of typhoid fever, should be taken as soon as cholera appears. The first evacuations of choleraic diarrhea are infectious, and should, as well as all that follow, be immediately carefully disinfected. Suspected drinking-water should be boiled.

General directions for the prevention and restriction of scarlet fever, diphtheria, small-pox, and typhus fever.

1. To avoid the contagium or special cause of the disease:

Isolation and disinfection are the important measures. Unless you are needed to care for the sick or are protected by having recently had the disease or, in case of small-pox, by thorough vaccination, do not go near the sick person. Do not allow your lips to touch any food, cup, or spoon, or anything else that the sick person has touched or that has been in the sick room. Do not wipe your face or hands with any cloth that has been near the sick person. Do not wear any clothing that the sick person has worn, during, just before, or just after his sickness. Keep your hands free from discharges from the body or skin of the sick person. Do not touch him with sore or scratched hands. Avoid inhaling or in any way receiving into the mouth or nose the branny scales that fall or peel from one recovering from, or apparently wholly recovered from scarlet fever; also any dust from the dried saliva of a person sick with or recovering from scarlet fever or diphtheria. The germs of diphtheria sometimes remain in the throat weeks after apparent complete recovery.

2. To restrict the contagium or special cause of the disease:

Isolate the sick. Separate those sick with any of these diseases, even if they are but mildly sick, from all persons except necessary attendants. A person sick with any of these diseases should not be permitted to suffer for want of care, food, or comfort; but all his wants should be attended to by adults or by those who are protected by proper vaccination or by having had the disease. Children and those who are not thus protected, should be kept away from these diseases. Do not go from a sick-room to a child or other unprotected person until after change of clothing and thorough washing of hands, face, hair, and beard.* Always wash the hands thoroughly after any handling of the sick person or anything that has been in contact with the sick person. Keep those who have been exposed to any of these diseases away from schools, churches, and other assemblies, and from all children, until it is known whether they are infected,—and if they are found to be infected, isolate them until after complete recovery and thorough disinfection.

3. To destroy the contagium or special cause of the disease:

a. Thoroughly disinfect or destroy whatever is removed from the person sick or from the sick-room. All discharges from the lungs, nose, throat and mouth, should be burned or disinfected. All other discharges from the patient should be received into vessels containing a strong solution of chlorinated lime (not less than one ounce to each discharge from the bowels) and then, in cities, thrown into the water-closet; elsewhere, they should be buried at least 100 feet distant from any well; or where this is impracticable they may be received on old cloths which should immediately be burned or disinfected and buried.

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* Corrosive sublimate, one part to one thousand parts of cologne or water, is sometimes used by physicians for this purpose. This solution should be labelled POISON.

b. Thoroughly disinfect the sick-room and its contents, after removal of the sick person, whether by death or recovery. Disinfect as follows:

Burn whatever has been in contact with the sick person and is not too valuable to burn. Garments, sheets, blankets, etc., such as will not be injured thereby should be boiled for half an hour. After death or recovery of the patient, subject the room and *all its contents* to the fumes of burning sulphur. Before fumigating, hang up and loosely spread out clothing, bedding, etc., or spread them loosely over chairs, leaving the bedstead, other furniture, and every thing in the room. Close all openings to the room very tightly. For a room ten feet square, place three pounds of sulphur in an iron pot or pan, that will not leak, supported on bricks over water in a tub. Set the sulphur on the fire with live coals or with a spoonful of alcohol lighted by a match. Be careful not to breathe the sulphurous fumes. Leave the room tightly closed for several hours, then air it thoroughly. For a large room use a proportionally larger quantity of sulphur at the rate of three pounds for each 1,000 cubic feet of air space, and burn as much as possible of the sulphur used.

4. Keep your premises and everything connected therewith clean, but remember that *the contagium of these diseases may attach to the cleanest article* of clothing, food, drink, book, or paper, if it is exposed thereto.

5. The law requires householders and physicians to notify the local health officer of the first case and of every case of one of these diseases. The penalty for violation of this law may be as much as one hundred dollars. Plain and distinct notices should be placed on the house or premises in which there is a person sick with one of these diseases.

Unless the local board of health orders otherwise, whoever violates the orders of the health officer is liable to a fine, and to imprisonment if the fine is not paid.

More complete statements of means of restricting and preventing these diseases, are in the pamphlets issued by the State Board of Health, on the "Restriction and Prevention of Scarlet Fever," the "Restriction and Prevention of Diphtheria," the "Restriction and Prevention of Measles," the "Restriction and Prevention of Small-pox," the "Restriction and Prevention of Consumption," and the "Prevention of Typhoid Fever," any of which may be had by addressing the Secretary of the State Board of Health, Lansing, Michigan.

A letter of instructions [No. 227.] to "School Commissioners, to School Boards, Superintendents, and Teachers" which was hektographed during the quarter ending June 30, 1895, and approved at the meeting of the Board in July, 1895, has been printed this quarter to the number of 10,000 copies, and widely distributed. It is here reproduced as follows:

RELATIVE TO TEACHING HOW DANGEROUS COMMUNICABLE DISEASES ARE SPREAD AND HOW RESTRICTED.

[227.] [FOURTH EDITION, JANUARY, 1896.]

To School Commissioners, School Boards, Superintendents, and Teachers throughout Michigan:—

The present legislature has passed a law, Act No. 146, laws of 1895, which is very important for the interests of public health in Michigan, and with which it gives the State Board of Health great pleasure to comply. The Board realizes that it will be difficult for it directly to reach all the teachers; therefore it gratefully acknowledges aid already given it by the office of the Superintendent of Public Instruction, and respectfully asks the aid of school commissioners, school boards, and superintendents, in placing in the hands of the teachers this circular, and especially the one [226.] supplying the data and statements which will enable teachers to comply with this law. The law is as follows:

Act No. 146, Laws of 1895.

An Act to provide for teaching in the public schools, the modes by which the dangerous communicable diseases are spread and the best methods for the restriction and prevention of such diseases.

Sec. 1. *The People of the State of Michigan enact,* That there shall be taught in every year in every public school in Michigan the principal modes by which each of the dangerous communicable diseases is spread, and the best methods for the restriction and prevention of each such disease. The State Board of Health shall annually send to the public school superintendents and teachers throughout this State printed data and statements which shall enable them to comply with this act. School boards are hereby required to direct such superintendents and teachers to give oral and blackboard instruction, using the data and statements supplied by the State Board of Health.

Sec. 2. Neglect or refusal on the part of any superintendent or teacher to comply with the provisions of this law, shall be considered a sufficient cause for dismissal from the school by the school board. Any school board wilfully neglecting or refusing to comply with any of the provisions of this act, shall be subject to fine or forfeiture, the same as for neglect of any other duty pertaining to their office. This act shall apply to all schools in this State, including schools in cities or villages, whether incorporated under special charter or under the general laws.

This law is to be in effect on and after August 30, 1895. Herewith there is sent to you a copy of a leaflet [226.] issued by the State Board of

Health to school superintendents and teachers, in compliance with the above-mentioned law, supplying to teachers the "printed data and statements which shall enable them to comply with this act."

The leaflet supplies the data and statements in a condensed form, and it is hoped that it will be found by teachers to be useful and convenient. It is believed that, to most teachers, it will be more convenient than would be much more complete treatises on the restriction and prevention of each disease. However, the State Board of Health publishes more complete pamphlets and leaflets relative to each of several of the most dangerous diseases, and such pamphlets and leaflets will be sent to those teachers who may wish to have them. A request to the Secretary of the State Board of Health at Lansing, will receive attention. The request should state explicitly what disease the publication that is wanted relates to, and whether the publication is wanted in any other language than the English. A sufficient number of such publications can sometimes be had to supply the members of such classes as, by reason of mature age, or of being engaged in special studies in hygiene, it is especially important should have in their hands a full discussion of the subject. Teachers of such classes are respectfully invited to correspond on this subject, with the Secretary of the State Board of Health.

For a still larger number of pupils, it is possible that there may be supplied copies of the leaflet [226.] sent herewith, containing the data and brief statements relative to *all* the most dangerous communicable diseases. On this subject, also, correspondence of teachers with the Secretary of this Board, is invited.

The law requires teachers "to give oral and blackboard instruction, using the data and statements supplied by the State Board of Health." It is hoped that teachers will be able so to simplify the statements supplied by the Board that the important facts shall be taught to even the smallest pupils and to all the pupils in every school.

By direction of the State Board of Health.

Very respectfully,
HENRY B. BAKER,
Secretary.

OFFICE OF THE SECRETARY OF THE
STATE BOARD OF HEALTH,
Lansing, Mich., July, 1895.

Copy for a "Plate Accession Book" was prepared, and a book has been printed and bound, and is now in use in the office.

In Sept., 1895, a final report blank [O.] relative to typhoid fever was prepared and printed to the number of 500 copies, as follows:—

[O] FINAL REPORT RELATIVE TO TYPHOID FEVER.

[DO NOT FILL OUT AND RETURN THIS UNTIL THE OUTBREAK IS OVER.]

..............................P. O.,..............................Co., Mich.,
....189....

To the Secretary of the Michigan State Board of Health, Lansing, Michigan:

1. This disease was called by the attending physician*..
(Name the disease.)

2. All the cases included in this report occurred in the..of
(Township, City or Village.)
....County of..Michigan.
(Name of Township, etc.)

3. The mode of introduction of the disease into my jurisdiction, was as follows:..............................
....
(See remarks concerning this question in the printed letter.)

4. The origin of this outbreak of disease was as follows:..

5. If any beside the first case were sick with typhoid fever, how did they contract the disease?..........
....

6. The first case was taken sick..............189.. The last case died, or was recovered..............189..
(Give date.) (Give date.)

7. At the beginning of this outbreak, in how many households was this disease?..............................

8. At the close of this outbreak, in how many households has this disease been?..............................

9. In this outbreak there have been..............cases in my jurisdiction, of which..............died.
(Number.) (Number)

10. Previous to being taken sick, what was the ordinary source of drinking water of the first person taken sick in this outbreak? From a well?.............................. From a general water supply?..........

11. If from a well, how many privies are within one hundred feet of this well?..............................

12. Has there been any sickness from *any fever* during the last twelve months in any of the persons using one of these privies?.............................. If so, what was the fever?..............................

13. How much more or less than the usual depth of water was there in the well just previous to, or at the time of the beginning of this outbreak?..

14. Was water from some other source drank about seven to fourteen days previous to beginning of sickness?..

15. When (how many months or years ago) was there a case of typhoid fever on the premises where the first case of this outbreak occurred?..

16. In this outbreak were all the bowel discharges, of all the sick, disinfected before being removed from the house?.................. For which patient was this done?.............................. On what day of the sickness was it begun?..............................How much of what disinfectant was used for each discharge?..

17. What was done with the bowel discharges from each of the patients?..............................

18. How much of what disinfectant was used in the privy vault used by the patient?..............................
.... How many cubic feet of excreta are now in the privy vault?..............................

19. Was the clothing or bedding which was soiled by the discharges of the patient thoroughly disinfected?.................. For which of the patients was this done?..............................

20. Was the room which the patient occupied while sick, together with its contents, disinfected with burning sulphur?.................. If so, how much sulphur was burned? ....lbs., which was about ....lbs. per thousand cubic feet of air space. For which of the patients was this done?..

21. Was everything which came in contact with a sick person destroyed by fire, or disinfected thoroughly?.......... How?..

22. In this outbreak, which cases were kept isolated from every person except physician and nurse?
....

23. How many cases were so isolated?..

24. Was the water from the wells on or near the infected premises boiled before being drank?.......... If so, when was the use of the boiled water commenced?.............................. How long continued?..

---

*Typhoid fever, typho-malarial fever, continued fever, etc., as the case may be.

25. What else was done to restrict the spread and prevent the reappearance of the disease?..........

26. After the first person was taken sick what exceptions were there to the complete accomplishment of the foregoing measures,—disinfection of excreta, boiling of water drank, etc.?..............

27. In this outbreak how many of the cases can you trace to a previous case?........................

28. What was the mode of spreading?..

29. The evidences of success attending the efforts at restriction were: ....

30. The following facts bear on the subject of the period of incubation:......................... ....

Very respectfully,

.... (Name.)

.... (Please state whether Health Officer, President or Clerk.)

Of the Board of Health of.................................... (Name of City, Village, or Township, and state which.)

NOTE.—Relative to "Special Final Reports" and the Disinfection which the Law Requires shall be Done by the Health Officer.

The answers to the questions in this blank are important for the purpose of acquiring a correct knowledge of how typhoid fever is spread; and it is suggested that while the health officer is on the premises where the first case occurred, that he make a memorandum of the circumstances, or fill in the answers on this sheet, as he will then be able to question the members of the family relative to such answers as he himself cannot supply.

These final reports, when properly filled out, are of great value in determining the best methods for preventing and restricting communicable diseases, but omissions in them sometimes detract greatly from their value. It is almost impossible to compile from letters and postals, but if the desired information is in its proper place on this blank form, its compilation is practicable.

It is especially important that we learn whether or not the fumigation by burning sulphur is efficient as a disinfectant, and what quantity of sulphur is required to accomplish disinfection. *The law* (Act 137, Laws of 1883) *requires the health officer to disinfect*, therefore it is possible in every case for the health officer to know just how it was done, and how much sulphur was used; but if the exact quantity "per thousand cubic feet of air-space" cannot be stated, an estimate of the quantity used for each room should be made and stated in the report in connection with the statements of the length, breadth and height of each room fumigated.

In this report, a prepared space not filled by you cannot be compiled the same as if filled with a "O," because, if left blank it indicates that the item has been overlooked.

After the close of the outbreak, will you have the kindness to fill all the spaces in this "final report blank," making the statements as complete and exact as possible, and return the report to this office?

This report is asked for under the law which requires special reports to be made by the health physicians, when they are asked for by the State Board of health.

Very respectfully,

HENRY B. BAKER,
Secretary.

"Blue-Letter" and "Final Report" relative to Consumption.

During the latter part of this quarter considerable work has been done in connection with a "Blue-letter" (official demand for reports, transmitting publications, giving information, etc.) and with a "Final report" to be used in collecting information tending to show the results of efforts for the restriction of that disease. It is hoped that, in consequence of these papers, much valuable information will be received at this office. The "Blue-letter" [No. 203] and the "Final report" blank [R.], relative to consumption have been sent to the printer, but only the blue-letter has been printed. The final report blanks will be ready for use in a few days.

Final Report Blank for Small-pox.

Considerable work has been done on a new "Final report" blank [Q.] to be used in collecting information regarding the results of efforts in the restriction and prevention of small-pox in Michigan. The "copy" for this blank was prepared during the latter days of the quarter, and the blank will soon be printed and ready for use.

Rearrangement and Classification of Plates.

Heretofore, there has been no systematic classification of the photo-engraved plates, wood-cuts, etc., belonging to the office. Therefore, when one was wanted for use, time was consumed in searching for it. During this quarter, considerable time was given to work for the improvement of these conditions. A "Plate Accession Book" and a "Plate Proof Book" were made. Two proofs of each plate (then in the office) were made by the State Printer, each plate was given a number, and the proofs were given a corresponding number. The number, title, etc., of each plate, were entered in the "Plate Accession Book," and one copy of the proof of each plate was pasted in the "Plate Proof Book," the number of the page being the number of the plate. The second copy of the proof was numbered in accordance with the number of the plate, and filed for future use. A file-case in the office was utilized for the filing of the plates in their numerical order, each number being visible. About 464 plates were thus numbered, and placed, commencing with number 301, as there were already about three hundred plates stored in the store-room at the old State office building. Other plates were found, not likely to be used in the near future, and they were taken from the office to that store-room.

Work in Connection with Sickness Statistics.

During the third quarter of 1895, 2,580 blank postal report cards, 167 record-books and 71 printed circulars regarding weekly card-reports, have been mailed to 161 health officers and regular correspondents; 1,213 weekly card-reports have been received and entered on the register; 53 copies of the hektographed weekly bulletin, "Health in Michigan," were mailed each week, and 107 copies of the monthly bulletin, "Health in Michigan," have been hektographed and mailed each month. These bulletins have been consolidated for this quarterly report. The article on "Statistical Study of Sickness in Michigan in 1893," for the annual report for 1894, has been completed and the compilation of the weekly card-reports of sickness during the year 1894, for the annual report for 1895, has been commenced during this quarter.

Health in Michigan in the Third Quarter of 1895. Communicable Diseases.

Compared with the preceding quarter (April, May and June, 1895), reports from all sources show *typhoid fever* to have increased by an average of *sixty* places, *consumption* to have increased by an average of *eighteen* places, *small-pox* to have increased by an average of *one* place, *measles* to have decreased by an average of *twenty-one* places and *scarlet fever* to have decreased by an average of *fifteen* places. *Diphtheria* was reported in the *same* number of places as in the preceding quarter.

Meteorology at one Central Station, and Sickness throughout Michigan from all Causes, Third Quarter of 1895, Compared with the Preceding Quarter.

A comparison of meteorological conditions of the third quarter of 1895, with the meteorological conditions of the preceding quarter, shows the prevailing direction of the wind to have been the same (south-west), the average velocity 0.8 of a mile per hour less, the temperature 8.56 degrees higher, the rain-fall 1.18 inches more, the absolute humidity considerably more, the relative humidity to have been the same, the day and night ozone much less and the depth of water in the well at Lansing 2 inches less than in the second quarter of 1895. (The observation well at Lansing was found to be dry June 15, July 15, August 15 and September 15, 1895).

Compared with the preceding quarter (April, May and June), the reports from regular observers show a marked increase of dysentery, cholera infantum, cholera morbus, typhoid fever and diarrhea, and a marked decrease of pneumonia, influenza, scarlet fever, bronchitis, pleuritis, erysipelas, tonsillitis and inflammation of kidneys in the third quarter of 1895.

The Weather and the Health in Michigan in the Third Quarter of 1895, Compared with the Averages of those Conditions in the Third Quarters of the Nine Years, 1886–1894.

A comparison of the meteorological conditions of the third quarter of 1895, with the average for the third quarters in the nine years, 1886–1894, shows that in 1895, the prevailing direction of the wind was the same (south-west), the velocity was 0.9 of a mile per hour greater, the temperature was 2.01 degrees higher, the rainfall was .32 of an inch more, the absolute humidity was slightly less, the relative humidity and the day and night ozone were much less, and the depth of water in the observation well at Lansing was 30 inches less.

Compared with the average in the corresponding quarters in the nine years 1886–1894, the reports from regular observers indicate that typhoid fever was much more than usually prevalent, and that typho-malarial fever, intermittent fever, pulmonary consumption, inflammation of bowels, remittent fever, whooping-cough and erysipelas were less than usually prevalent in the third quarter of 1895.

Probably some of the increase in the reports of typhoid fever, and a corresponding decrease in the reports of typho-malarial fever, both have come about because of action by the State Board of Health October 8, 1889, in advising that "in all cases of fever of doubtful origin continuing more than seven days, precautions should be taken as in typhoid fever." Dealing with such fevers as typhoid, for public-health purposes, has apparently gradually resulted in their being called typhoid fever more generally than was formerly the custom. [Four pages of manuscript relative to the status of typhoid fever in Michigan, and relative to the non-action of the health officials of Detroit for the reporting, placarding and restricting of typhoid fever is omitted here, but most of it will probably be printed in the article on typhoid fever, further on in this Report.]

SECRETARY'S REPORT OF DANGEROUS COMMUNICABLE DISEASES, OF WORK DONE IN THE OFFICE OF THE STATE BOARD OF HEALTH, AND OF THE CONDITION OF HEALTH GENERALLY IN MICHIGAN DURING THE QUARTER ENDING DECEMBER 31, 1895.

Dangerous Communicable Diseases.

The number of reports of outbreaks of dangerous communicable diseases in Michigan, received from all sources and filed, and the corresponding number concerning which action was taken by this office, during the quarter, are as follows: For diphtheria, 133; for scarlet fever, 104; for typhoid and typho-malarial fever, 256; for measles, 19; for whooping-cough, 32; for small-pox, 4; and for consumption, 34. Total for the seven diseases, 582.

The number of communications relative to dangerous communicable diseases, received and placed on file during the quarter, was 3,055.

Relative to dangerous communicable diseases, letters, written cards, and demands for weekly and final reports on cards, or in the form of the circular letter, were sent out during the quarter to the number of 2,110.

The "final" reports of outbreaks received and filed during the quarter were: For diphtheria, 106; scarlet fever, 88; typhoid and typho-malarial fever, 189; measles, 18; Whooping-cough, 18; small-pox, 7; consumption, 16. Total for the seven diseases, 442.

During the quarter, the local columns of 1,403 newspapers, have been looked over for reports of occurrence of communicable diseases. (This work is done by the clerk who acts as messenger and janitor, in the intervals of his performance of other duties.) This has resulted in giving this office information of the alleged occurrence of 9 outbreaks of diphtheria, 9 outbreaks of scarlet fever, 58 outbreaks of typhoid and typho-malarial fever, 1 outbreak of measles, 3 outbreaks of whooping-cough, and 7 cases of consumption. To what extent the reports of these alleged outbreaks were verified, is shown in the accompanying table:

TABLE 1.—FOURTH QUARTER OF 1895.—*Exhibiting the number of outbreaks of Diphtheria, Scarlet fever, Typhoid fever, Measles, Whooping-cough, Small-pox, and Consumption, from October 1, to December 31, 1895, of which notice was received at the office of the Michigan State Board of Health; the per cent of reports, information concerning which was received through the Newspapers; the per cent of newspaper reports which were confirmed by the health officer; the per cent of newspaper reports which were denied by the health officer; and the per cent relative to which no reply was received from the health officer.*

Diseases.	Reports from *all* sources, Oct. 1 to Dec. 31, 1895.	Per cent of all reports which were obtained from the newspapers.	Per cent of newspaper reports which were confirmed by the health officer.	Per cent of newspaper reports which were denied by the health officer.	Per cent of newspaper reports to which the health officer made no reply to notice sent from this office.
Diphtheria	133	7	22	22	56
Scarlet fever	104	9	22	0	78
Typhoid fever	256	23	40	10	50
Measles	19	5	100	0	0
Whooping-cough	32	10	0	0	100
Small-pox	4	0	0	0	0
Consumption	34	21	43	0	57
Average for the seven diseases		15	36	9	55

Small-pox in Michigan in the Fourth Quarter of 1895.

Four new outbreaks of small-pox were reported during the quarter. These occurred in Rochester village, Oakland Co.; Hamtramck township, Wayne Co.; Dover township, Lenawee Co.; and Park township, St. Joseph Co. The outbreak at Dover township was afterwards reported to be chicken-pox. Final reports have been received for the other three outbreaks which began during this quarter. A final report has also been received from Battle Creek city, which outbreak began during the second quarter of 1895, and final reports have also been received from the following named places in which outbreaks began during the third quarter of 1895: Bedford township, Calhoun Co.; Marshall city, and Battle Creek township, Calhoun Co.

In the three new outbreaks of small-pox which occurred during the quarter ending December 31, 1895, there have occurred 6 cases and 1 death.

In 5 of the seven outbreaks, relative to which final reports have been received during the quarter ending December 31, 1895, the infection was restricted to the one house in which it first occurred.

The outbreak which began in Detroit in May, 1894, still continues. During the quarter ending December 31, 1895, there have occurred in that city 9 new cases and 2 deaths, and at the close of this quarter 2 cases were still sick.

At this date, January 1, 1896, small-pox is present at only one place, Detroit.

Summary Relative to the Year, 1895.

The number of reports of outbreaks of dangerous communicable diseases in Michigan, received from all sources and filed, and the corresponding number concerning which action was taken by this office during the year 1895, are as follows: for diphtheria 411; for scarlet fever 529; for typhoid and typho-malarial fever 633; for measles 176; for whooping-cough† 77; for small-pox 25; and for consumption 309. Total for the seven diseases 2,160.

The number of communications relative to dangerous communicable diseases, received and placed on file during the year, was 8,878.

Relative to dangerous communicable diseases, letters, written cards, and demands for weekly and final reports on cards, or in the form of the circular letter, were sent out during the year to the number of 6,945.

The "final" reports of outbreaks received and filed during the year were: for diphtheria 342; scarlet fever 493; typhoid and typho-malarial fever 372; measles 125; whooping-cough† 29; small-pox 29; consumption 23. Total for the seven diseases 1,413.

During the year, the local columns of 4,364 newspapers, have been looked over for reports of occurrence of communicable diseases. (This work is done by the clerk who acts as messenger and janitor, in the intervals of his performance of other duties.) This has resulted in giving this office information of the alleged occurrence of 17 outbreaks of diphtheria, 26 outbreaks of scarlet fever, 129 outbreaks of typhoid and typho-malarial fever, 8 outbreaks of measles, 6 outbreaks of whooping-cough†, 1 outbreak of small-pox and 24 outbreaks of consumption. To what extent the reports of these alleged outbreaks were verified, is shown in the accompanying table:

---

† Whooping-cough for the last six months of the year.

TABLE II.—YEAR 1895.—*Exhibiting the number of Outbreaks of Diphtheria, Scarlet Fever, Typhoid Fever, Whooping-cough, Small-pox, Consumption, and Measles, from January 1 to December 31, 1895, of which notice was received at the office of the Michigan State Board of Health; the per cent of reports, information concerning which was received through the Newspapers; the per cent of newspaper reports which were confirmed by the health officer; the per cent of newspaper reports which were denied by the health officer, and the per cent relative to which no reply was received from the health officer.*

Diseases.	Reports from *all* sources, Jan. 1-Dec. 31, 1895.	Per cent of all reports which were obtained from the newspapers.	Per cent of newspaper reports which were confirmed by the health officer.	Per cent of newspaper reports which were denied by the health officer.	Per cent of newspaper reports to which the health officer made no reply to notice sent from this office.
Diphtheria	*411	4	23	24	53
Scarlet fever	*529	5	31	12	57
Typhoid fever	*633	20	29	19	52
Measles	*176	5	37	25	38
Whooping-cough†	77	8	17	0	83
Small-pox	*25	4	100	0	0
Consumption	*309	8	58	4	38
Averages for the seven diseases	....	10	32	17	51

* The numbers of outbreaks given in this table do not necessarily agree with the numbers given in tables in another part of the Annual Report, for the reason that all alleged outbreaks, of which information was obtained from the newspapers and other sources are included in this table. If the health officers denied that such outbreaks occurred, or if they make no response to the letters sent from this office, relative to newspaper reports, such alleged outbreaks are not included in the compilation of that disease.

† Whooping-cough for the last six months of the year.

A record is kept of facts concerning every outbreak of a "disease dangerous to the public health," upon which action is taken by this office, and also of every communication relating thereto received or sent out. This required over 15,800 entries to be made in the "Record Books," one of which books is kept for each dangerous communicable disease.

During the year 1895 compared with the year 1894, action was taken on outbreaks of dangerous communicable diseases as follows: On diphtheria, 58 outbreaks less; scarlet fever, 127 outbreaks less; on typhoid and typho-malarial fever, 186 outbreaks more; measles, 99 outbreaks less; and small-pox, 36 outbreaks less than in 1894. In all 124 outbreaks more were acted upon in 1895 than in 1894, and 279 outbreaks more in 1895 than in 1893. No action was taken relative to whooping-cough until July 1, 1895, since which time 77 outbreaks have been acted upon, therefore no comparison can be made relative to that disease, and relative to consumption a just comparison cannot be made of that disease for the years 1894 and 1895, for the reason that no action was taken relative to consumption until April 1, 1894, however a comparison of the last nine months of 1894, with the year 1895, shows 181 outbreaks more, acted upon in 1895 than in 1894.

Small-pox in Michigan During the Year, 1895.

Twenty-five new outbreaks of small-pox were reported during the year. These occurred in Bengal township, Clinton Co.; Southfield township, Oakland Co.; Plymouth village, Wayne Co.; Highland Park village, Wayne Co.; Mayville village, Tuscola Co.; Pontiac city; Royal Oak township, Oakland Co.; Hamtramck township, Wayne Co., (two outbreaks); Grand Rapids city; Three Rivers village, St. Joseph Co.; Ypsilanti city; Watson township, Allegan Co.; Brownstown township, Wayne Co.; Battle Creek city, (two outbreaks); Olivet village, Eaton Co.; Danby township, Ionia Co.; Charleston township, Kalamazoo Co.; Bedford township, Calhoun Co.; Marshall city; Battle Creek township, Calhoun Co.; Rochester village, Oakland Co.; Dover township, Lenawee Co.; and Park township, St. Joseph Co. The outbreak reported at Mayville and the outbreak reported at Three Rivers, were errors in reporting, as no small-pox was present at either place, and the outbreak reported at Dover township, was afterwards reported to be chicken-pox. Final reports have been received for each of the remaining twenty-two outbreaks. These final reports show that there have occurred in the State (outside of Detroit) during the year 1895, 56 cases and 11 deaths, and that in 18 of the 22 outbreaks the infection was restricted to the one house in which it first occurred.

The outbreak which began in Detroit in May, 1894, still continues. During the year 1895, there have occurred in that city 137 new cases and 37 deaths, which, with the 17 cases that were still sick at the close of the year 1894, make a total of 154 cases and 37 deaths during the year 1895. (From the beginning of the outbreak in May, 1894, up to December 28, 1895, there have occurred in the city of Detroit 277 cases and 71 deaths.)

During the year 1895, there have occurred in the State, including the city of Detroit, 193 new cases and 48 deaths, which with the 17 cases which were still sick in Detroit at the close of the year 1894, make a total of 210 cases and 48 deaths during the year 1895.

Compiling, Editing, Proof-reading, Printing, etc.

The compilation of reports from all sources relative to typhoid fever in Michigan in 1893, has been completed and proved. The compilation relative to measles in Michigan in 1893 has been made, and proved. The compilation of material relative to small-pox in Michigan in 1893 has been made. Compilation of material relative to whooping-cough, mumps, consumption, and other diseases in Michigan in 1893, have been made. Compilations of material relative to casualties from the use of kerosene, gasoline and naphtha, in Michigan in 1893, has been made. The foregoing compilations are all for use in the Annual Report for 1894.

The compilation of reports from all sources relative to diphtheria in Michigan in 1894 (for the Annual Report for 1895) has been commenced.

Compilations are all made on the meteorological registers for the year 1894, and the tables therefrom have been completed.

Meteorological registers for each of 19 stations for each month, except December, for the year 1895 have been received, examined for errors and all computations made, humidity and atmospheric pressure excepted.

Work has been done on the compilation of the weekly card-reports of sickness during the year 1894, for the Report for 1895.

Proof-reading.

Proof has been read on the article "Meteorological Conditions in Michigan in 1893", except the last 16 pages which have not as yet been put in type.

Proof has been read on the last fifty pages of "Part I" of the Annual Report for 1893, and on the index for the same report. The index covers about 80 pages of print.

Editorial Work.

Editorial work on the compilation relative to scarlet fever in Michigan in 1893, together with maps illustrative thereof, has been completed. Most of the preparatory work in connection with the compilation relative to typhoid fever in Michigan in 1893, has been done. The index for the Annual Report for 1893 was made and proved. The compilations relative to nuisances, kerosene, gasoline, and naphtha in Michigan in 1893, have been prepared for publication in the Annual Report for 1894.

The printing of the Annual Report for 1893 has been completed, and the printing on the Annual Report for 1894 has been commenced.

Work on Meteorology.

The regular tri-daily observations have been continued at this station, and a summary for each week and month during the quarter has been made for use in the office in connection with sickness statistics. The monthly summary has been sent at the end of each month to the director of the Michigan Weather Service and Local Forecast official for his use; by him it is sent to the Chief of the U. S. Weather Bureau, at Washington, D. C.

The yearly supply of meteorological blank registers, stamped envelopes, and other meteorological material, were sent to each of 22 observers for the State Board of Health, for their use during the year 1896. Ozone test-paper sufficient to last three months was also sent to each of 15 observers.

Making Diagrams, etc.

Diagrams and maps were made to illustrate articles in the Annual Reports of this Board, as follows:—

1. Diagrams.—"Reported Deaths from diphtheria in Michigan, 26 years, 1868–93."
2. Diagram.—"Per cent of Deaths from Diphtheria within certain period of age in Michigan."
3. Map.—"Movements of Contagium of Diphtheria in Michigan in 1893."
4. Diagram.—"H. M. Loud's Lumber Camp, No. 8, Alcona Co., Mich."
5. Diagram.—"Isolation and Disinfection Restricted Diphtheria in Michigan in 1893."
6. Map.—"Movements of Contagium of Scarlet Fever, in Mich., in 1893."

Hektograph Work.

Hektograph work to the number of 8,528 pages has been made, including 3,198 pages relative to the spread and restriction of typhoid fever in

Michigan; 1,032 pages for weekly and monthly bulletins, "Health in Michigan"; 755 pages relative to teaching in the public schools the modes of spreading and the best methods for the restriction and prevention of dangerous communicable diseases; 750 pages (50 original copies) list of health officers of cities and villages in Michigan; 394 pages relative to small-pox in Michigan in 1893; 358 pages of a circular letter for the guidance of railroad authorities relative to the transportation of dead bodies; and 351 pages relative to commendations of the work of the State Board of Health. A large proportion of the remaining pages relate to the meetings of the State Board of Health in the form of notices and abstracts of proceedings of meetings.

Accessions to the Library, Card-Cataloguing, etc.

About 64 books and pamphlets, and some 325 numbers of journals (weeklies, monthlies and quarterlies) have been received and entered in the library accession book.

The work on the card-catalogue of the library has been continued.

Work in connection with the financial accounts of the office has been continued.

Reprinting leaflets, pamphlets, circulars, diagrams, etc.

The slip containing on one side the resolution of the Board placing consumption on the list of dangerous diseases, and on the other side recommendations for the prevention and restriction of the disease, was reprinted to the number of 30,000 copies.

The two-page leaflet diagram with "Deaths in Michigan, 10 years, 1884–93" on one side and "Pathogenic Micro-organisms,—'Germs' of Diseases" on the other side, was printed to the number of 3,000 copies.

The two-page leaflet diagram with "Lives saved by public health Work" on one side, and "Isolation and Disinfection Restricted Scarlet Fever and Diphtheria in Michigan during the 5 years 1886–90" on the other side, was reprinted to the number of 13,000 copies.

The two-page leaflet [No. 227] circular letter relative to teaching in the schools the modes of spreading and the best methods for the restriction and prevention of the dangerous communicable diseases, was reprinted to the number of 5,000 copies. The four-page leaflet [No. 226] giving short statements on the same subject was reprinted to the number of 20,000 copies.

The eight-page leaflet [No. 106] relative to the "Restriction and Prevention of Diphtheria" was amended somewhat and printed to the number of 10,000 copies.

The four-page leaflet [No. 124] on "The Prevention of Typhoid Fever" was amended somewhat and printed to the number of 10,000 copies.

The four-page leaflet [No. 175] on "The Restriction and Prevention of Consumption" was amended slightly and printed to the number of 10,000 copies.

The two-page leaflet with diagram "Typhoid Fever and Sewers in Munich" on one side, and diagram "Low Water in Wells, and Sickness from Typhoid Fever in Michigan, by months, period of 14 years, 1878 and 1880–92" on the other side, was reprinted to the number of 3,000 copies.

During the latter portion of this quarter circulars of instructions and blanks were prepared and sent to health officers and clerks of townships, cities and villages in Michigan for their annual reports of cases of sickness and deaths, etc. for the year 1895. The report blanks [J] to clerks, and the circular letter [I] to health officers were amended slightly and reprinted to the numbers of 1,800 and 1,700 respectively. The circular letters [No. 217] to clerks and the circular letter [No. 218] to health officers giving instructions for making their annual reports were printed to the numbers of 1,800 and 1,700 respectively. For the year 1895 will be the last year clerks will be required by laws to receive reports of dangerous diseases.

New blanks, leaflets, etc.

In the last quarterly report of work in the office was mentioned work in connection with a final report [Q] on small-pox, and a final report [R] on consumption. Early in this quarter these report blanks were printed; 300 copies of blank [Q] and 500 copies of blank [R] were printed. These new blanks will be found as follows:—

[Q.]

FINAL REPORT RELATIVE TO SMALL-POX.

[EXCEPT BY SPECIAL REQUEST, DO NOT FILL OUT AND RETURN THIS UNTIL THE OUTBREAK IS OVER.]

..........P. O.,..........Co., Mich.,
..........189....

To the Secretary of the Michigan State Board of Health, Lansing, Mich.:

1. The first case of this disease was called by the attending physician..........
....
(Small-pox, chicken-pox, measles, etc., as the case may be.)

2. All the cases included in this report occurred in the..........
(Township, city, or village.)
of..........County of..........Michigan.
(Name of township, etc.)

3. The source of contagium, and the mode of introduction of the disease into my jurisdiction, were as follows:..........
(See remarks concerning this question in the printed letter.)

4. Where was the first person who was taken sick with small-pox, exposed to the disease?..........

5. How was the first case exposed?..........

6. How were the other persons who were sick, exposed to the disease?..........

7. If any beside the first case were sick with small-pox, or varioloid, how did they contract the disease?..........

8. The first case was taken sick..........189... The last case was taken sick..........189...
(Give date.) (Give date.)
The last death, or recovery, (indicate which) occurred..........189.....
(Give date.)

9. The number of cases sick in each month (or part or day of month) during this outbreak was:—In
Jan.........., Feb.........., March.........., April.........., May.........., June..........,
July.........., Aug.........., Sept.........., Oct.........., Nov.........., Dec..........189..;
Jan.........., Feb.........., March.........., April.........., May.........., June..........,
July.........., Aug.........., Sept.........., Oct.........., Nov.........., Dec..........189...

10. At the beginning of this outbreak, in how many households was this disease?..........

11. At the close of this outbreak, in how many households has this disease been?..........

12. In this outbreak there have been..........cases in my jurisdiction, of which..........died.
(Number.) (Number.)

13. In the above number of cases and deaths, how many were varioloid?..........cases, ...deaths.

14. Previous to being taken sick, what was the occupation of the first person taken sick in this outbreak?..........

15. Was the first case a resident, immigrant, visitor or traveler?..........

16. Were all persons who were known to have been exposed to the disease, vaccinated?..........
How long after the exposure was that vaccination?..........

17. Were all persons likely to have been exposed, promptly vaccinated?..........

18. How many patients were there who had not been vaccinated?..........
19. If any or all of the patients were vaccinated, when was it done?..........
20. In how many instances did the recent vaccination "work"? ....
21. Where was the virus obtained?.......... Was it bovine virus?.......... Where propagated?..........
22. What evidence was there as to how fresh was the virus?..........
23. Was general vaccination and revaccination publicly recommended by you or your local board of health..........? How?..........
24. Was free vaccination and revaccination offered by your local board of health?..........
25. Was vaccination and revaccination general?..........
26. About what number and proportion of your citizens were vaccinated or revaccinated? ....
27. Which of the patients were kept isolated from all other people except nurse and physician? ....
28. What precautions were taken by the attending physician to prevent carrying to others the contagium of the disease? ....
29. Fully describe how you isolated the patient, and other methods you may have taken to restrict the disease ....
30. If any deaths in this outbreak, state how the funerals or burials were conducted..........
31. The evidence of success attending the efforts at restriction was:..........
32. In this outbreak how many of the cases can you trace to a previous case?..........
33. What was the length of time from exposure of each patient until the patient was taken sick?..........
34. What other facts bear upon the subject of the period of incubation? ....
35. Was everything which came in contact with a sick person destroyed by fire, or disinfected thoroughly?.......... How?..........
36. How were the discharges of the patients disinfected? ....
37. How were the discharges disposed of?..........
38. Was the privy used by any patient?.......... If so, how was the seat disinfected?..........
39. Was the privy itself disinfected by the fumes of burning sulphur?..........
40. During the outbreak and after the outbreak was over, was all the bedding used, the clothing worn by the patients, nurses and others exposed to infection, disinfected before it came in contact with any person not isolated with the person sick? ....
41. For which of the patients was this done?..........
42. How was it done?..........
43. After each death or recovery was the room which the patient occupied while sick, together with its contents, disinfected with burning sulphur? .... If so, how much sulphur was burned?.....lbs. which was about..........lbs. per thousand cubic feet of air space. For which of the patients was this done?..........
44. After the case was over, was every house in which a case occurred, in this outbreak, disinfected by burning sulphur?.......... Were all the rooms disinfected?.......... The cellars? .... The garrets?.......... The privies?.......... Was any room disinfected?..........
45. The least amount of sulphur burned in any instance was..........lbs. per thousand cubic feet of air space
46. What else was done to restrict the spread and prevent the reappearance of the disease? ....
47. After the first person was taken sick what exceptions were there to the complete accomplishment of the foregoing measures of disinfection, isolation, etc.? ....

Very respectfully,

....
(Name.)

....
(Please state whether Health Officer, President or Clerk.)
Of the Board of Health of ....
(Name of City, Village or Township, and state which.)

NOTE.—*Relative to "Special Final Reports" and the Disinfection which the Law Requires shall be done by the Health Officer.*

The answers to the questions in this blank are important for the purpose of acquiring a correct knowledge of how small-pox is spread; and it is suggested that while the health officer is on the premises where the first case occurred, that he make a memorandum of the circumstances, or fill in the answers on this sheet, as he will then be able to question the members of the family relative to such answers as he himself cannot supply.

These final reports, when properly filled out, are of great value in determining the best methods for preventing and restricting communicable diseases, but omissions in them sometimes detract greatly from their value. It is almost impossible to compile from letters and postals, but if the desired information is in its proper place on this blank form, its compilation is practicable.

The law (Act 137, Laws of 1883) *requires the health officer to disinfect*, therefore it is possible in every case for the health officer to know just how it was done, and how much sulphur was used.

In this report, a prepared space not filled by you cannot be compiled the same as if filled with a "0," because, if left blank, it indicates that the item has been overlooked.

After the close of the outbreak, will you have the kindness to fill all the spaces in this "final report blank," making the statements as complete and exact as possible, and return the report to this office?

This report is asked for under the law which requires special reports to be made by the health physicians, when they are asked for by the State Board of Health.

Very respectfully,
HENRY B. BAKER,
Secretary.

SPECIAL FINAL REPORT RELATIVE TO A CASE OF CONSUMPTION (TUBERCULOSIS.)

[R.] (Required under Sec. 8, Act, 81, laws of 1873, being § 1629, Howell's Statutes.)

(*This blank to be filled out and returned after the case has recovered or died.*)

------ -- ------ Mich.,

---- ---------------------- ------------189----

To the Secretary of the State Board of Health, Lansing, Michigan:

1. The disease about which this report is made is CONSUMPTION (tuberculosis).

2. The case included in this report occurred in--- (Township, city or village.) of-- (Name of township, etc.) County of-------------------------------State of Michigan.

3. What was the disease called by the attending physician?--

4. Was this a case of well-developed tuberculosis of the lungs? --------------------------------------

5. In what part of the body was the disease located?---

6. The name of the patient is-- ---------------------------

7. The case was taken sick-----------------------------, 189----, and died or recovered (indicate which) ------------------------------------189----.

8. When taken sick the Age of the person was-----------years. The Sex------------ The Nationality ----------------. ------Married. Color was ---------------. Complexion------------------------------- (Dark or light.) Hair was -- ---- ----- ---------------. (Dark, light, auburn.)

9. The occupation of the patient before being taken sick was-----------------------------. Occupation since being taken sick was ---.

10. The patient's habits as to visiting an unventilated church, theater, or public hall, where the disease may have been contracted, were --

11. Was there a case of consumption previous to this one in any family in which this patient formerly resided?------------------------- If so, when did that case occur? -----------------------------

12. When (how many months or years ago) was there a case of consumption on the premises where this patient resided at the time of or just before being taken sick? -----------------------------

13. Had or has the patient any relative who is or has been sick with consumption?------------ If so, how was that person related to the patient? ------------------ When was the relative sick?------------ Did the relative die or recover?------ ----------- When?---------------------- --------------------------

14. Did the patient associate with any consumptive person?---------- If so, who? ---------- Where? -------------------- When?--------------------------

15. Can you trace this case to a former case of consumption or tuberculosis?------------------------ If so, how?--------------------------- Is the other case now living?----------------------------

16. The probable origin of this case, the source of contagium was as follows:-------------------------

17. Did this case begin as a "bad cold," influenza, bronchitis, or pneumonia, or was the first observed change a hemorrhage?---

18. Can you trace any other case of tuberculosis in man to this case? --------- If so, how?----------

19. Was the patient intelligent and conscientious in every effort to restrict the spread of the tubercle bacilli?----------------- If not, what were the habits of the patient in this regard?------------------

20. Did the patient have the care of cows or other animals?-------------- If so, when?------------ Where?-----------------------------------

21. Was the sputa of this patient permitted to reach the hay or floor in front of any animals?-------.

22. Is there any evidence of the disease being spread from this patient to any animal?---------------

23. Was isolation of this patient practiced?-------- If so, give a short statement of when and how it was enforced or practiced?--

24. Was the sputa or any discharge examined for the *Bacillus tuberculosis?* If so, by whom?-------- -----------With what results?--

25. Was all the sputa from this patient disinfected before being permitted to dry?------------------ If so, how was it done?--

26. Was all the clothing or bedding which was liable to be soiled or infected with the sputa of the patient thoroughly disinfected?-------- If so, how was it disinfected or destroyed?--------------------

27. Was everything which was liable to be soiled by this patient's sputa destroyed by fire or disinfected thoroughly?---------------------- How?----------------------------------

28. What was done with the bowel discharges of this patient?------------------------------------

29. Was the bedroom which the patient occupied while sick, together with its contents, disinfected with burning sulphur?---------- If so, how much sulphur was burned?----------lbs. Was the sitting room of the patient disinfected?------------ Were all the rooms in the patient's residence disinfected? --------- The cellars?--------- The garrets?--------- The privies?----------- Was any room disinfected?------------------------------

30. The total amount of sulphur burned was--------------lbs. which was about--------------lbs. per thousand cubic feet of air space.

31. The size, length, breadth, height, of each room in which sulphur was burned was about: Room 1 --------------------------; Room 2----------------; Room 3------------; Room 4.----------------
(Thus 11x11x9.)

32. What else was done to restrict the spread of the disease?------------------------------------

33. After the patient was taken sick, what exceptions were there to the complete accomplishment of the foregoing measures for restriction, such as disinfection of sputa, etc.?----------------------------

Very respectfully,

--, *Health Officer.*
(Name.)

Of the Board of Health of--
(City, village or township, state which.)

NOTE.—*Relative to "Special Final Reports" concerning consumption, and the Disinfection which the Law Requires shall be done by the Health Officer.*

The final report should always be made within a reasonable length of time after the case is dead or recovered, but not until after the recovery or death.

It is possible to have more than one outbreak in a jurisdiction, at the same time. That is, two or more cases of the disease may occur at the same time in different sections of a jurisdiction, which have no connection with each other, and in which the sick have not contracted the disease, one from the other, or from infected things that have passed from one to the other, or have not received the contagium from the same source. On the other hand, the case reported on this blank may be one of several which there is good reason to believe were causally connected. When such is the case, the two or more cases should be reported separately, from the commencement, but the reports distinctly marked "Case 1," "2," "3," etc., "of Outbreak No. 1," "No. 2," etc., stating the names of the patients in each outbreak.

These final reports, when properly filled out, are of great value. It is almost impossible to compile from letters and postals, but if the desired information is in its proper place on this blank form, its compilation is practicable.

The law (Act 137, Laws of 1883) *requires the Health Officer to disinfect*, therefore it is possible in every case for the health officer to know just how much sulphur or other disinfecting substance is used; but if the exact quantity "per thousand cubic feet of air space" cannot be stated, an estimate of the quantity used for each room should be made and stated in the report in connection with the statements of the length, breadth and height of each room fumigated.

In this report, a space prepared in the blank and not filled by you cannot be compiled the same as if filled with a "O," because, if left blank, it indicates that the item has been overlooked.

After a death, or the close of outbreak by recovery, will you have the kindness to *fill all the spaces* in this "Final report blank," making the statements as complete and exact as possible and return the report to this office.

This report is asked for under the law which requires special reports to be made by the health officer, when they are asked for by the State Board of Health.

Very respectfully,

HENRY B. BAKER,
Secretary.

During the quarter a two-page leaflet [No. 228] to railroad officials, health officers, physicians, relative to what are "Communicable Diseases Dangerous to the Public Health" and relative to the transportation of dead bodies was prepared, and printed to the number of 10,000 copies. The leaflet is as follows:—

Memoranda for the Guidance of Railroad Officials, Health Officers, Physicians and Others,

RELATIVE TO WHAT ARE

"Communicable Diseases Dangerous to the Public Health."

*With reference especially to Act 45, Laws of 1895.**

[228] [Leaflet issued by the Michigan State Board of Health.]

[FIRST EDITION DECEMBER 10, 1895.]

To properly provide for the transportation of sick persons and dead bodies in a manner which will avoid the spread of dangerous communicable diseases, is an important item in the restriction of such diseases. In order to save a little time and avoid effort in giving notice and obtaining permits, it is quite a common occurrence for interested persons to *disguise the real cause of sickness or of death.*

Dangerous communicable diseases often exist, when nothing is done by the physician, the householder, or the health officer, for their restriction, because physicians not only do not always report them to the health officer, but sometimes call these cases by names which are not usually understood to specify a "disease dangerous to the public health."

The legislature having enacted Act 45, laws of 1895, the State Board of Health has thought it an opportune time to place before railroad officials, health officers, physicians, and the people generally, a statement of just what are "communicable diseases dangerous to the public health," as the phrase is in that law; and, as well, a few of the ways in which the public-health interests are being disregarded by unscrupulous persons; and also to suggest how the public may be better guarded from such diseases:—

Document No. 226, issued by the Michigan State Board of Health, says: "In Michigan the most dangerous communicable diseases, named in the order of their importance as causes of deaths, are consumption, pneumonia, influenza,† diphtheria, typhoid fever, scarlet fever, measles, whooping-cough and small-pox." Cholera is named in the Act 45, laws of 1895. Other dangerous communicable diseases are: glanders, rabies, tetanus, typhus fever, yellow fever, puerperal fever, erysipelas, cerebro-spinal meningitis, and German measles (sometimes called rötheln).

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* Act 45, Laws of 1895, is as follows:

An act to prevent the introduction of a dangerous communicable disease in any township, city or village in Michigan, except under specified regulations.

SECTION 1. *The People of the State of Michigan enact,* That no person sick with cholera, small-pox, diphtheria, scarlet fever or any other communicable disease dangerous to the public health, no corpse of a person dead from one of the above-named diseases, or from any other communicable disease dangerous to the public health, and no article which has been infected or is liable to propagate or convey any such disease, shall come or be brought into any township, city or village in Michigan, without the special permit of the board of health or of the health officer of said township, city or village, and then only under the supervision of the health officer of said township, city or village.

SEC. 2. Whoever shall violate the provisions of section one of this act, or the order of the health officer made in pursuance thereof, shall, on conviction, be deemed guilty of a misdemeanor, and shall be punished by a fine of not more than one hundred dollars, or by imprisonment in the county jail not exceeding three months, or by both said fine and imprisonment.

Approved March 29, 1895. In effect on and after August 30, 1895.

† Up to the year 1889, influenza caused few deaths in Michigan; but in 1890, 1891 and 1892, the deaths reported from it averaged over 1,000 per year.

Most of these dangerous communicable diseases are sometimes called by other names. As examples, consumption is called phthisis, phthisis pulmonalis, tuberculosis, marasmus, etc.; pneumonia is called inflammation of the lungs, lung fever, etc.; influenza is sometimes called grip; diphtheria is called croup, heart failure, etc.; typhoid fever is called typho malarial, malarial, remittent, etc.; scarlet fever is called scarlatina, canker-rash, etc.; puerperal fever is called peritonitis; small-pox is called variola and varioloid; rabies is usually called hydrophobia; tetanus is commonly called lock-jaw.

Whenever the cause of sickness or of death is stated as one of the above-mentioned diseases or conditions, even if the local physician does certify that it is "not contagious," the provisions of Act No. 45, laws of 1895, and other laws for the restriction of disease should be enforced; also in every case of any "fever of doubtful origin continuing more than seven days," also in every case of any fever which proves fatal; also in every case of membranous croup, and any croup which proves fatal.

Instances have been reported to this office where an unqualified person signed the special permit "required by Act 45, Laws of 1895." Care should be taken by every person responsible for the movement of a sick or an infected person, corpse, or article, that the required "special permit" be signed by an official legally qualified to do so. It should be signed by the health officer.

Every person responsible for the introduction into any locality of a person sick with a dangerous communicable disease, or a body dead of such disease, should give to the health officer of that locality, timely notice of the prospective entry of such person or body, in order that the health officer may, as the law requires, supervise the entry of such diseased person or such dead body into his jurisdiction.

Sec. 14. The Board of Health may grant permits for the removal of any nuisance, infected article, or sick person within the limits of their township, [city or village,—Act 145 of 1879] when they shall think it safe and proper so to do. §1646, Howell's Statutes.

From this it will be seen that a permit by the board of health for the removal of an infected article, dead body, or sick person *is good only within the limits of the township, city or village in which the permit is granted.*

No health officer or board of health should permit the removal to another jurisdiction in Michigan of a person sick with or dead from a disease declared by the Michigan State Board of Health to be a "disease dangerous to the public health" without first seeing the "special permit" of the health officer of the township, city or village to which it is proposed to move the sick person or dead body, nor until the health officer of the place to which the infected person or body is to go has had such notice of the time of the prospective arrival of the person or body as will enable him to supervise the entry and disposal as the law provides.

Every railroad or other transportation agent at the point of destination of any such sick person or dead body should notify the health officer of his locality, or know that he has been notified, of the arrival, and if possible of the prospective arrival of a person or body which under Act 45, Laws of 1895, requires the supervision of such health officer.

Every railroad agent or other person receiving an application for the transportation of any sick person or dead body, should first learn from the health officer or other legal health authority of the city, village or township where such application is made, the disease from which the person is suffering or which caused the death of such body. If such sickness or death is or has been caused by some disease declared by the Michigan State Board of Health to be "dangerous to the public health," such railroad or other transportation agent should refuse to transport such sick person or dead body until by telegram or otherwise a special permit shall have been procured from the health officer of the township, city or village to which such dead body or sick person is sought to be transported. Such railroad or other transportation agent should refuse to transport such sick person or dead body until convinced that the health officer of the place of destination has had such notice of the prospective entry into his jurisdiction as will enable him to supervise its entry, as the law provides.

By direction of the State Board of Health.

Very respectfully,

Henry B. Baker,
Secretary.

Office of the Secretary of the
Michigan State Board of Health,
Lansing, Mich., Dec. 10, 1895.

The following is a time slip for use in the office which has been prepared and printed to the number of 1,500 copies:—

OFFICE OF MICHIGAN STATE BOARD OF HEALTH.

Time Slip ...., 189......

	TIME.	
Mr	Hours.	Minutes.
Absent with or without leave (indicate which), A. M.		
" " " " " " " P. M.		
Late in Morning		
" " Afternoon		
Overtime before morning session		
" after " "		
" before afternoon "		
" after " "		
Total		

NOTE.—All lost time, and all overtime must be made to appear. The reason for any absence, overtime, or tardiness should be given on reverse side.

[A second and revised edition of this slip was printed in June, 1896, to the number of 2,000 copies.]

Distribution of Publications, etc.

Copies of the Annual Report of this Board for 1893, have been sent to thirteen members and ex-members of the Board, and copies have been distributed to about forty sanitarians in this and other States. Wrappers for about 675 annual reports have been addressed, but not yet sent out.

To the officials of about thirty railroads doing business in Michigan, have been sent about 3,400 copies of the two-page leaflet [No. 228], for distribution to their local agents. A copy of the leaflet will be found on pages 15-16 of this Report.

There have been sent to 121 newspaper editors in Michigan the four-page leaflet [No. 226], giving the short data and statements relative to teaching in the schools the subject of the modes of spreading and the best methods for the restriction and prevention of the dangerous communicable diseases, the leaflet [No. 228] relative to what are "diseases dangerous to the public health", a copy of a hektograph abstract of the special meeting of this Board, Nov. 15, 1895, and a copy of the hektogragh page relative to "The pay should be sure", and a copy of the four-page leaflet [No. 124] "The prevention of Typhoid Fever." To 31 editors of newspapers, especially those published in the Upper Peninsula, were sent the leaflet [No. 124], and a copy of a circular letter [No. 1596] relative to the danger of typhoid fever spreading from Duluth, Minn., into Michigan.

To 94 sanitary journal exchanges have been sent: A hektograph abstract of proceedings of regular meeting of this Board Oct. 11, 1895; hektograph pages relative to "Typhoid Fever in Michigan in the third quarter of 1895", "Small-pox in Michigan in 1895", copy of a letter to Doctor Samuel P. Duffield, health officer of Detroit, "Michigan a Healthful State", "Boil your drinking water", "Campaign of Education", brief abstract of the special meeting of the Board Nov. 15, the four-page leaflet [No. 124] on "The Prevention of Typhoid Fever", and circular [No. 226] relative to teaching sanitary science in the public schools.

To each of 1,585 health officers of townships, cities and villages in Michigan have been sent a copy of blank [I], a blank for copy of record of diseases dangerous to the public health, a circular letter [No. 218] of instructions, a return envelope; all for the purpose of making to this Office their annual reports for the year 1895.

To each of 1,584 clerks of townships, cities and villages have been sent a copy of blank [J], a blank for copy of record of diseases dangerous to the public health, circular letter [No. 217] of instructions, a blank for report of medical practitioners, and a return envelope, all for the purpose of making to this Office their annual report for the year 1895. To each clerk was sent a copy of sections 1,675 and 1676 Howell's Statutes, as amended by the legislature of 1895, which requires all reports of cases of diseases dangerous to the public health to be made directly to the health officer only, instead of to the health officer, clerk or president of the local board of health. All reports are now to be made directly to the health officer.

Excepting the pamphlets relative to typhoid fever, of which about two thousand more than the usual number have been sent out, about the usual numbers of pamphlets on the restriction and prevention of the different dangerous diseases were sent to the health officers of localities in which dangerous diseases have been reported. It was at the same time requested of these health officers that the pamphlets be distributed to the *neighbors of* *the person sick with such a disease*, and to such other persons as the pamphlets would be likely to benefit.

In response to special requests of sanitarians in this and other States, copies of annual reports, proceedings of meetings, proceedings of sanitary conventions held in Michigan under the auspices of this Board, and pamphlets on the restriction and prevention of the dangerous communicable diseases, have been sent where it was thought likely to benefit the public-health interests.

The usual record of distribution of the publications has been kept.

Distribution of Publications to School Teachers and Officers.

During the quarter an immense amount of work has been occasioned in the Office, complying with the law (Act 146, laws of 1895) which requires that the State Board of Health shall supply data and statements to every teacher in Michigan, that there may be taught in every year in every school in Michigan the modes of spreading and the best methods for the restriction and prevention of the dangerous communicable diseases. All that was required by the law was the four-page leaflet [No. 226] which gives the "data and statements" as the law requires. It was thought essential that a circular [No. 227] letter of instructions be sent to teachers and school officers with leaflet No. 226. The board had promised also at the close of the leaflet [226] to supply to each teacher who desired them, the more complete statements or leaflets relative to each of the dangerous diseases.

A circular letter has been sent to each county school commissioner in the State, and to each superintendent of a city school in Michigan, asking if the teachers in the county (and city) had received the "data and statements" required under Act 146, laws of 1895, and whether if they were sent the commissioner or superintendent would distribute them to the teachers in his jurisdiction, also offering the more complete leaflets in sufficient quantities to supply each teacher. Fifty-seven out of 83 county school commissioners and 60 out of 76 superintendents of city schools have been heard from, and a number of clerks have been kept busy a greater share of the quarter endeavoring to comply with the requests. A larger or smaller number of sets have been sent, according to the number of teachers in the county or city. Where the packages were too large to be sent by mail, they were sent by express, charges prepaid. It is thought most of the teachers in Michigan have come into possession of a set of several different leaflet publications of this Office relating to the modes of spreading and the best methods for the restriction and prevention of the dangerous diseases.

The following is a statement which will give an idea of the numbers and the localities to which the above-mentioned publications have been sent:—

To each of 30 county school commissioners a circular letter (No. 1569) and one copy of each of the following publications were sent: Leaflet on the restriction and prevention of scarlet fever, pamphlet on the work of health officers, leaflets on the restriction and prevention of typhoid fever, consumption, measles, small-pox, a slip relative to consumption, leaflet No. 226, circular No. 227, report of legislative investigation of this Board, an extract of paper by Prof. Fall relative to teaching hygiene and a paper by the secretary on the restriction and prevention of small-pox.

The above-mentioned circular letter and practically the same publications were sent to the remaining (50) county school commissioners, except that no pamphlet on the work of health officers was sent, and there were sent the leaflets on the restriction and prevention of diphtheria, and two-page leaflet diagrams plates 516–517 and plates 651–681.

A set consisting of one copy of each of the leaflets on the restriction and prevention of scarlet fever, typhoid fever, and consumption slip, leaflet No. 226, circular No. 227, and plates 516–517, was sent directly by mail to each of 302 teachers in Washtenaw county, to each of 70 in Cheboygan county, to each of 248 teachers in Genesee county, to each of 80 teachers in Gogebic county, to each of 67 teachers in the city of Lansing, to each of 140 in Bay City, and to county school commissioners of Eaton county 275 sets for distribution to the teachers in Eaton county.

To each of 157 *directors* of schools in Genesee county, three sets of the above-mentioned publications and plates were sent, together with a circular letter asking them to hand one set to each of the two other members of their board, and reserve one set themselves.

To each of 74 *directors* of schools in Wexford county, two sets of publications and plates similar to those sent to the directors of the schools in Genesee county. To each of these directors a return postal card addressed to this office was sent, for acknowledgment and comments.

To each of 75 *superintendents of city schools* was sent a set of the same publications as were sent to the directors of Wexford and Genesee counties, together with a circular letter asking the number of teachers employed in the schools of which they were superintendents.

For use in distributing to the teachers in attendance at the *State Teachers' Association* there were prepared 500 sets; each set containing the leaflets on diphtheria, scarlet fever, typhoid fever, consumption, consumption slip, leaflets Nos. 226 and circular 227, and plates 516–517 and 651–681. During one of the sessions of the institute Prof. Fall made a few brief remarks relative to the leaflets which could be had at the door where two clerks were ready to supply sets of the leaflets. Sets of the publications to the number of 375 were thus distributed.

Summary—Of the 76 superintendents of city schools, 60 have replied to the circular letter (1585) from this office and have been supplied with sets of publications to the number of 3,799; of the 83 county school commissioners in Michigan, 56 have replied to the circular letter (1595) from this office and 34 have so far (Jan. 7, 1896) been supplied with sets of the publications to the number of 5,938; the remaining 22 county school commissioners who have been heard from but whose requests have not been complied with because of lack of certain leaflets and for lack of time; county school commissioners of 27 counties in Michigan have not as yet replied to the circular letter from this office. Sets to the number of 471 have been sent to directors of school districts in Genesee county for the members of their school board; and sets to the number of 160 have been sent to the directors of school districts in Wexford county, one set for the teacher and one set for the director. At the State Teachers' Association 375 sets were distributed.

The *total number* of sets of publications sent from this Office to teachers and school officers in Michigan, is 10,743.

During the quarter (Sept., Oct., and Nov.) with the regular supplies for teachers' institutes the Office of the Superintendent of Public Instruction has supplied enough copies of Nos. 226 and 227 for the teachers of 48 counties; and 32 counties have not yet been supplied from the Office of the Superintendent of Public Instruction. From Jan. 1 to the present date (Jan. 8) the institutes for Allegan, Cass, and Wayne counties have been supplied through the Office of the Superintendent of Public Instruction with sets of publications from this Office. The sets were similar to those supplied to other teachers.

What Others Think of the New Law.

Supt. C. O. Hoyt of the Lansing city schools says, "At this time I wish to express my hearty approval of the law and of the great and lasting good that will come from its enforcement."

Supt. W. M. Andrus of the Petoskey city schools says, "The subject is receiving attention in all grades."

Supt. C. T. Grawn of the Traverse City schools says, "Our teachers are taking considerable interest in the subject."

Supt. O. I. Woodley of the Menominee schools says, "We will do all in our power here to further the good work."

Supt. H. T. Blodgett of the Ludington schools says, "I am in full sympathy with the work of the Department and am anxious to do efficient work in this important line of instruction."

Ex-Supt. F. W. Arbury of the Battle Creek schools says, "Permit me to congratulate you and the State Board of Health in your efforts to furnish instruction along the line of the restriction and prevention of the dangerous communicable diseases. You should have the hearty and earnest support of every teacher and patron of our public schools."

WORK IN CONNECTION WITH SICKNESS STATISTICS.

During the fourth quarter of 1895, 124 packages, containing 2,123 blank postal report-cards, 144 record-books and 20 printed circular letters, regarding weekly card-reports, have been mailed to 124 health officers and regular correspondents; 1,119 weekly card-reports have been received and entered on the register; 52 copies of the hektographed weekly bulletin "Health in Michigan," were mailed each week, and 108 copies of the hektographed monthly bulletin "Health in Michigan," have been mailed each month. These bulletins have been consolidated for this quarterly report. Work has also been done on the compilation of the weekly card-reports of sickness during the year 1894, for the annual report for 1895.

Health in Michigan in the fourth quarter of 1895. Communicable Diseases.

Compared with the preceding quarter (July, August, and September), reports from all sources show *typhoid fever* to have increased by an average of *sixty-nine* places, *diphtheria* to have increased by an average of *twenty-three* places, *scarlet fever* and *consumption* each to have increased by an average of *nine* places, *measles* to have decreased by an average of *six* places, and *small-pox* to have decreased by an average of *one* place.

Meteorology and Sickness from all Causes, fourth quarter of 1895, Compared with the preceding quarter.

A comparison of meteorological conditions of the fourth quarter of 1895, with the meteorological conditions of the preceding quarter, shows the prevailing direction of the wind in the fourth quarter of 1895, to have been south, (instead of west and south-west), the average velocity 1.1 miles per hour greater, the temperature 32.19 degrees lower, the rainfall at Lansing .89 of an inch more, the absolute humidity much less, the relative humidity and the day ozone more, and the night ozone slightly less. (The observation well at Lansing was found dry on June 15, and has remained dry excepting for a few days following a rainfall of 2.88 inches, August 23, and of 4.08 inches, December 16 to 20.)

Compared with the preceding quarter (July, August, and September), the reports from regular observers show a marked increase of pneumonia, influenza, scarlet fever, tonsillitis, pleuritis, bronchitis, erysipelas, and typhoid fever, and a marked decrease of cholera infantum, cholera morbus, dysentery, and diarrhea in the fourth quarter of 1895.

The Weather and the Health in Michigan, in the fourth quarter of 1895, Compared with the average for the corresponding fourth quarters in the nine years 1886–1894.

A comparison of the meteorological conditions of the fourth quarter of 1895, with the average for the fourth quarters in the nine years 1886–1894, shows that in 1895, the prevailing direction of the wind was south, (instead of southwest), the velocity 1 mile per hour less, the temperature 1.33 degrees lower, the rainfall at Lansing 1.29 inches more, the absolute and relative humidity and the day and night ozone all slightly less, and the depth of water in the well at Lansing 23 inches less.

Compared with the average in the corresponding quarters in the nine years, 1886–1894, the reports from regular observers indicate that typhoid fever and scarlet fever were more than usually prevalent, and that intermittent fever, consumption, diphtheria, remittent fever and pneumonia were less than usually prevalent in the fourth quarter of 1895.

Respectfully submitted,

HENRY B. BAKER,
Secretary.

SECRETARY'S REPORT OF DANGEROUS COMMUNICABLE DISEASES, OF WORK DONE IN THE OFFICE OF THE STATE BOARD OF HEALTH, AND OF THE CONDITION OF HEALTH GENERALLY IN MICHIGAN DURING THE QUARTER ENDING MARCH 31, 1896.

Dangerous Communicable Diseases.

The numbers of reports of outbreaks of dangerous communicable diseases in Michigan, received from all sources and filed, and concerning which action was taken by this Office, during the quarter, are as follows: For diphtheria, 115; for scarlet fever, 123; for typhoid and typho-malarial fever, 91; for measles, 68; for whooping-cough, 58; for small-pox, 8; and for consumption, 137. Total for the seven diseases, 600.

The number of communications relative to dangerous communicable diseases, received and placed on file during the quarter, was 2,462.

Relative to dangerous communicable diseases, letters, written cards, and demands for weekly and final reports on cards, or in the form of the circular letter, were sent out during the quarter to the number of 1,901.

The "final" reports of outbreaks received and filed during the quarter were: For diphtheria, 108; scarlet fever, 84; typhoid and typho-malarial fever, 151; measles, 20; whooping-cough, 27; small-pox, 1; consumption, 28. Total for the seven diseases, 419.

During the quarter, the local columns of 1,422 newspapers, have been looked over for reports of occurrence of communicable diseases. (This work is done by the clerk who acts as messenger and janitor, in the intervals of his performance of other duties.) This has resulted in giving this Office first information of the alleged occurrence of 9 outbreaks of diphtheria, 2 outbreaks of scarlet fever, 14 outbreaks of typhoid and typho-malarial fever, 3 outbreaks of measles, 6 outbreaks of whooping-cough, 1 outbreak of small-pox and 15 cases of consumption. To what extent the reports of these alleged outbreaks were verified, is shown in the accompanying table:

TABLE 1.—First Quarter of 1896.—*Exhibiting the number of outbreaks of Diphtheria, Scarlet fever, Typhoid fever, Measles, Whooping-cough, Small-pox, and Consumption, from January 1, to March 31, 1896, of which notice was received at the office of the Michigan State Board of Health; the per cent of reports, first information concerning which was received through the Newspapers; the per cent of newspaper reports which were confirmed by the health officer; the per cent of newspaper reports which were denied by the health officer; and the per cent relative to which no reply was received from the health officer.*

Diseases.	Reports from *all* sources Jan. 1 to Mar. 31, 1896.	Per cent of all reports which were obtained from the newspapers.	Per cent of newspaper reports which were confirmed by the health officer.	Per cent of newspaper reports which were denied by the health officer.	Per cent of newspaper reports to which the health officer made no reply to notice sent from this office.
Diphtheria	115	8	11	22	67
Scarlet fever	123	2	0	0	100
Typhoid fever	91	15	36	21	43
Measles	68	4	0	67	33
Whooping-cough	58	10	17	50	33
Small-pox	8	12	100	0	0
Consumption	137	11	33	0	67
Average for the seven diseases		8	26	20	54

Small-pox in Michigan in the first quarter of 1896.

Eight new outbreaks of small-pox were reported during the quarter. These occurred in Riga township, Lenawee Co.; Imlay township, Lapeer Co.; Saginaw city, Ionia city, Greenbush township, Clinton Co.; Burlington township, Lapeer Co.; Marine City and Bay City. The outbreak at Greenbush township was afterwards reported to be measles. A final report has been received of the outbreak at Riga township. Relative to the outbreak at Burlington township, no report has been received from that place since February 28, and as only one case was reported it is safe to assume that the outbreak is now over.

April 1, 1896, small-pox is still present at five places, Bay City, Ionia, Imlay township, Marine City and Saginaw.

In the seven new outbreaks of small-pox which occurred during the quarter ending March 31, 1896, there have been reported 15 cases and 2 deaths.

The outbreak which began in Detroit in May, 1894, was reported as closed during the week ending March 28, 1896. During the quarter ending March 31, 1896, there have occurred in that city 20 new cases and 13 deaths, this with the two cases which were still sick at the close of the year 1895, make a total of 22 cases and 13 deaths in the city of Detroit during the first quarter of 1896. (From the beginning of the outbreak in May, 1894, up to March 28, 1896, there have occurred in the city of Detroit 297 cases and 84 deaths.)

During the quarter ending March 31, 1896, there have occurred in the State 35 new cases and 15 deaths from small-pox.

Compiling, Editing, Proof-reading, Printing, etc.

The compilation of reports from all sources relative to "Diphtheria in Michigan in 1894" has been completed and proved; the compilation of reports from all sources relative to "Scarlet fever in Michigan in 1894" is about two-thirds made, and proved nearly as far as made; and the material relative to "Alleged Nuisances in Michigan in 1894" has been compiled. The foregoing compilations are for use in the Annual Report for 1895.

The figures for absolute and relative humidity have been called onto the meteorological registers for each of the nine stations in Michigan, for the year 1895. Computations have been made for the average temperature, absolute and relative humidity, cloudiness, direction of the wind, day and night ozone, and rainfall, at each of the 9 to 15 stations in Michigan, for the year 1895. Meteorological registers from 10 stations, for the months of January and February, 1896, have been received and examined for errors.

Work has been continued on the compilation of weekly-card reports of "Sickness in Michigan in 1894" for the Report for 1895.

Articles relating to the experience in Michigan during the year 1893, for the Report for 1894, have been prepared relating to the following subjects:—Typhoid Fever, Measles, Rötheln, Typhus Fever, Whooping-cough, Small-pox, Consumption, Erysipelas, Puerperal Fever, Cholera, Cholera Morbus, Cholera Infantum, Mumps, Trichiniasis, Rabies, Glanders, Lump-jaw, (Actinomycosis,) Tyrotoxicon, Removal of Dead Bodies, Nuisances and Dangers to Life from Illuminating Oils. Work has been commenced on the article "Diphtheria in Michigan in 1894."

Copy on "Part I" of the Report for the fiscal year ending June 30, 1894, has been prepared for the printer.

As fast as the forms on the Report for 1894 have been received from the printer, the index for that report has been continued. About 90 pages of manuscript for the index have thus far been made.

Proof has been read on the following articles for the Report for 1894: Sickness Statistics, Diphtheria, Scarlet Fever, and Typhoid Fever.

The printing on the Report for 1894 has progressed rapidly; some 225 pages have been printed. The Report is more than half printed. Copy can now be supplied for the rest of the Report, and it is hoped to soon have the Report (for 1894) ready for distribution.

Work on Meteorology.

The regular tri-daily meteorological observations have been continued at this station, and a summary for each week and month during the quarter has been made for use in this Office in connection with sickness statistics. At the end of each month, the monthly summary has been sent to the Director of the Michigan State Weather Service at Lansing, for his use; it is then sent by him to the Chief of the U. S. Weather Bureau at Washington, D. C.

Ozone test-paper, sufficient to last three months, was sent to 15 meteorological observers for this Board.

Making Diagrams and Maps.

Diagrams and maps were made to illustrate articles in the Annual Report of the Board, as follows:—

1. "Exhibiting what per cent of all deaths from Scarlet Fever were of persons within certain periods of age."
2. "Isolation and Disinfection restricted Scarlet Fever in Michigan in 1893."
3. "Outbreak of Typhoid Fever in Otisco Township, Ionia Co., Mich."
4. "Isolation and Disinfection restricted Typhoid Fever in Michigan in 1893."
5. "Outbreak of Typhoid Fever in Sylvan Center, Washtenaw Co., Mich."
6. "Ages of persons who died of Measles in periods of years, 2 years. 1892–93."
7. "Isolation and Disinfection restricted Measles in Michigan in 1893."
8. "Age-Distribution of Decedents from Typhoid Fever, 2 years, 1892–93."
9. "Age-Distribution of Decedents from Consumption in Michigan. in 1893 (Large Diagram on cloth—29 by 36 inches.)"
10. "Alleged Nuisance in Vassar Village, Mich."
11. "Alleged Site of Nuisance in Mackinaw City Village."
12. "Average Temperature by months in Michigan, in 1894."
13. "Velocity of Wind by hours and months, Lansing, Mich., 1894."
14. "Velocity of Wind by hours and months, at Lansing, Mich., 1894."
15. "Absolute Humidity by months, in Mich., in 1894"
16. ".Relative Humidity by months in Mich., in 1894."

Diagrammatic maps were made as follows:

1. "Distribution of Diphtheria reported in Mich., in 1893."
2. "Distribution of Scarlet Fever reported in Mich., in 1893."
3. "Movements of Contagium of Measles in Michigan in 1893."
4. "Distribution of Typhoid Fever in Mich., in 1893."
5. "Distribution of Measles in Mich., in 1893."
6. "Movement of Contagium of Typhoid Fever in Mich., in 1893."

Hektograph Work.

During this quarter some 4,832 pages of hektograph work were prepared, including, principally, 1,050 pages for weekly and monthly Bulletins "Health in Michigan;" 990 pages "List of Health Officers" in Michigan, in 1895–96; 480 pages relative to diagnosis of small-pox; 448 pages relative to Dr. S. P. Duffield's refusal to make annual report to the State Board of Health in accordance with the law; 269 pages relative to the proceedings of the regular meeting of this Board, Jan. 10; 190 pages Nuclein in 30 cases of typhoid fever at Marquette; 110 pages relative to why annual reports are required of local health officers and the uses made of such reports; 105 "Prompt action of railroad authorities in preventing the spread of typhoid fever from Duluth"; 90 pages of "Systematic Study of

Natural Waters of Michigan Streams and Wells"; 55 pages of Interstate notification of outbreaks of small-pox in Michigan; 50 pages "After Bogus Doctor Factory in Chicago"; and 54 copies of a letter relative to proposed new cottage dormitory at the Ionia Asylum for Dangerous and Criminal Insane.

Accessions to the Library, Card-Cataloguing, etc.

About 74 books and pamphlets, and some 315 numbers of journals (weeklies, monthlies and quarterlies), have been received and entered in the library accession book.

The work on the card-catalogue of the library has been continued.

Work in connection with the financial accounts of the office have been continued.

Distribution of the Twenty-First Annual Report.

About 2,950 copies of the Annual Report for 1893 were distributed, somewhat as follows: To presidents and clerks of all city and village boards of health in Michigan; to health officers of townships, cities and villages in Michigan; sanitary journal exchanges, secretaries of State Boards of Health; secretaries of State Medical Societies; health officers in other States; Michigan correspondents of the Board; sanitarians in this and other countries; State Institutions and State officers in Michigan, and others.

Distribution of Educational Leaflets to Teachers and School Officers.

There have been sent from this office 8,285 sets of several different leaflet publications bearing upon the subject of teaching in the schools the modes of spreading and the best methods for the restriction and prevention of the dangerous communicable diseases. These sets have been distributed to county school commissioners, superintendents of schools, school officers, school teachers, and in some instances to pupils in schools of Michigan. In addition to these sets some 670 copies of the four-page leaflet No. 226 have been sent to teachers and pupils in Michigan. The office of the Superintendent of Public Instruction has distributed many thousand copies of the leaflets Nos. 226 and 227.

(A detailed report of this distribution of school leaflets has been prepared to supplement this short statement.)

General Distribution of Leaflets and Diagrams.

The two-page leaflet [No. 228] relative to the transportation of dead bodies, has been sent out to the number of 4,850 copies. The distribution has been to railroad authorities, station agents, health officers, and physicians, those especially interested in the requirements for transporting dead bodies.

About the usual number of pamphlets on the restriction and prevention of the dangerous communicable diseases were sent to health officers of localities in which dangerous diseases have been reported, It was at the same time requested of these health officers that the pamphlets be distributed to the *neighbors of the persons sick with such diseases* and to other persons likely to be benefited by the information therein contained. In response to special requests of sanitarians in this and other States and countries, copies of the annual report, proceedings of meetings, proceedings of sanitary conventions held in Michigan under the auspices of the

State Board of Health, and pamphlets on the restriction and prevention of the dangerous communicable diseases, have been sent where it was thought likely to benefit the public health interests.

The usual record of distribution of publications has been kept.

Return of the Names and Addresses of Health Officers, etc.

During the quarter 1,952 envelopes were addressed to 1,214 supervisors of townships. 293 presidents of villages, 293 clerks of villages, 76 mayors of cities and 76 clerks of cities. In each letter was sent a circular letter of instruction, and a blank for the return of the name and postoffice address of the health officer, for the ensuing year. A return envelope was also enclosed. At the same time and in the same envelope there was sent to each clerk of a city, two blanks, and to each supervisor of a township one blank for the use of the supervisors in making their lists of physicians, as required by Sec. 3, act 167, laws of 1883, as amended by act 268, laws of 1887. to be filed with the clerk of the township, village or city, for his record of each physician and each under-graduate practicing medicine in the township, village or city. At the same time, in case there is an incorporated village within the township, the supervisor of the township is sent an extra blank for keeping a record of physicians and under-graduates to be filed with the clerk of the village.

Annual Reports from Health Officers and Clerks.

Annual Reports for the year 1895 have been received from the health officers of 939 townships, from 52 cities and from 192 villages. Total, 1,183

Annual Reports for the year 1895 have been received from the clerks of 964 townships, from 26 cities, and from 155 villages. Total, 1,145.

Of the 1,588 jurisdictions (townships, cities and villages) in Michigan, annual reports have been received from either the health officer or clerk, or both, from 1,438 jurisdictions, leaving at the end of the quarter 150 jurisdictions delinquent, no annual report having been received from either the health officer or clerk. Of these 150 delinquent jurisdictions 81 are townships, 19 are cities and 50 are villages.

At the end of the quarter annual reports have not as yet been received from the health officers of 280 townships, 24 cities and 101 villages, and from the clerks of 245 townships, 50 cities, and 138 villages. Total delinquent health officers, 405; total delinquent clerks, 433.

February 14, 1896, a "Second request for annual report" was sent to the health officers of 482 jurisdictions, including townships, cities and villages, from which no annual report had been received from either health officer or clerk, and on March 13, 1896, a "Second request for annual report" was sent to 231 health officers and to 706 clerks of townships, cities and villages, upon whom no "second request" had previously been made.

Reports of medical practitioners in their jurisdictions have been received from 501 clerks of townships, cities and villages.

Reprinting Leaflets, Pamphlets, Circulars, Diagrams, etc.

The two-page leaflet diagram (plates 516-517) with "Lives Saved by Public Health Work" on one side, and "Isolation and Disinfection Restricted Scarlet Fever and Diphtheria during the five years 1886–90" on the other side, was reprinted to the number of 10,000 copies.

The two-page leaflet diagram (plates 651 and 681) with "Typhoid Fever and Sewers in Munich" on one side, and "Low Water in Wells, and Sickness from Typhoid Fever in Michigan, by months, period of 14 years, 1878 and 1880–92" on the other side, was reprinted to the number of 10,000.

The two-page leaflet [No. 227] circular relative to teaching in the schools the modes of spreading and the best methods for the restriction and prevention of the dangerous communicable diseases, was reprinted to the number of 10,000 copies.

The eight-page leaflet [110] "Restriction and prevention of Scarlet Fever" was slightly amended and reprinted to the number of 20,000 copies.

The six-page leaflet [176] "Restriction and Prevention of Measles" was amended slightly and printed to the number of 20,000 copies.

The four-page leaflet [175] "Restriction and Prevention of Consumption" was printed to the number of 20,000 copies.

A New Leaflet Published.

Considerable time has been required to prepare a new leaflet [229] on the "Restriction and Prevention of Whooping-Cough." Copy for the proposed new six-page leaflet was approved by the Board at its special meeting Feb. 15, 1896, and 10,000 copies were ordered printed. The leaflet was printed in February, and reads as follows:

RESTRICTION AND PREVENTION
OF
WHOOPING-COUGH

Laws Requiring the Reporting, Placarding and Disinfecting, in Every Case of Disease Dangerous to the Public Health; Facts Relating to the Age of Greatest Danger, and Importance of Restricting Whooping-Cough.

DOCUMENT ISSUED BY THE MICHIGAN STATE BOARD OF HEALTH.
FIRST EDITION (10,000), FEBRUARY, 1896.

[229.]

1. **Whooping-Cough is a Dangerous, Contagious Disease,** hence it is a "disease dangerous to the public health" under the laws in Michigan; and the observance of the following precautions is of importance.

2. Inasmuch as whooping-cough is one of the most contagious diseases and when uninfluenced by treatment runs a course of from two to three months, an average of ten weeks, and is spread by those sick with it before the "whoop" appears, therefore, in order that its restriction shall be most complete, it is important that the early symptoms be generally known. The first or catarrhal stage resembles an ordinary cold. The symptoms are a cough, usually rather severe with a tendency to become paroxysmal, sneezing, sometimes watering of the eyes, and often a slight fever. Restlessness, with a loss of appetite, and increased thirst, usually accompany these symptoms. It is often necessary to wait for the second stage, which is characterized by the "whoop" before the disease can be distinguished.

When a child or young person has symptoms of whooping-cough, or a cold or cough unusually severe with a tendency to become paroxysmal, it should immediately be kept separated from all other persons, except necessary attendants, until it is ascertained whether or not it has whooping-cough, or some other communicable disease.

3. **Period of Incubation.**—The interval between the date of infection and that of the outbreak of symptoms of whooping-cough usually varies between four and twenty-one days.

4. **Every person** known to be **sick with whooping-cough** should be **promptly** and **thoroughly isolated** from the public; no more persons than are actually necessary should have charge of or visit the patient, and they should be restricted in their intercourse with other persons.

5. **Plain and distinct notices should be placed upon the premises or house in which there is a person sick with whooping-cough.**

6. **Householders and Physicians** must immediately give notice of the first case and of every case of whooping-cough to the local health officer. This is required by law.*

DUTIES OF THE LOCAL BOARD OF HEALTH.

7. Upon the receipt of notice of the occurrence of whooping-cough, the health officer and the Board of Health have duties to perform in taking measures to restrict the spread of the disease, which it is a violation of public trust for such officers to neglect or postpone. That no time may be lost, it is the duty of every board of health to make provision for prompt action by its health officer, authorizing and directing him to be prepared at all times, as executive officer of the board, to take action without waiting for a meeting of the board, whenever a case of diphtheria, scarlet fever, measles. whooping-cough, small-pox, *or other disease dangerous to the public health* occurs within its jurisdiction. The duties of the local board of health relative to the restriction and prevention of diseases are treated of in a circular No. [120] issued by the State Board of Health.

DUTIES OF THE HEALTH OFFICER.

Some of the duties of the health officer generally required by law, may be briefly suggested as follows: Whenever he has reason to believe that there is in his jurisdiction a case of whooping-cough, he should,—

a. Promptly investigate the subject.

b. Order the prompt and thorough isolation of those sick or infected with whooping-cough.

c. See that no person suffers for lack of nurses or supplies.

d. Give public notice of infected places by placard on the premises, and otherwise if necessary.

e. Notify teachers or superintendents of schools concerning families in which there are cases of whooping-cough.

f. Supervise funerals of persons dead from whooping-cough.

g. Disinfect rooms, clothing and premises, and all articles likely to be infected, before allowing them to be used by other persons than those in isolation.

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*Section 1675 and § 1676, Howell's Statutes, as amended by Act 158, Laws of 1895. Supervisors must prosecute for all forfeitures under the law; township officers must give notice to supervisors; prosecuting attorney to conduct suit if requested.—sections 8439, 8440 and 8442, Howell's statutes. Health officers of villages and cities must notify prosecuting attorney of all violations of this law,—§ 1684, Howell's statutes; the prosecuting attorney must prosecute for all such forfeitures incurred within his county—§ 8442, Howell's statutes.

h. Keep the president of his board of health and the secretary of the State Board of Health constantly informed respecting every outbreak of whooping-cough.

In the absence of regulations made by the local board of health, conflicting therewith, orders by the health officer in the lawful performance of these duties have the force of regulations by the board of health.

Unless otherwise ordered by the local board of health, these duties are required of the health officer by Act 137, laws of 1883. Section 2 of this act, as amended by Act No. 34, approved March 28, 1889, provides that—

> "Whoever shall knowingly violate the provisions of section one of this act, or the orders of the health officer made in accordance therewith, shall be deemed guilty of a misdemeanor, and upon conviction thereof he shall be punished by a fine not exceeding one hundred dollars, and the cost of prosecution, or in default of payment thereof, by imprisonment not exceeding ninety days in the county jail, in the discretion of the court."

This penalty seems to apply to the health officer, or to whoever violates his orders. The health officer should also, in due time, give certificates of recovery and of freedom from liability to give whooping-cough, but not until after thorough disinfection following complete recovery.

THE RESTRICTION OF WHOOPING-COUGH.

8. The room in which one sick with whooping-cough is to be placed should *previously* be cleared of all needless clothing, carpets, drapery, and other materials likely to harbor the poison of the disease. This room should constantly receive a liberal supply of fresh air, without currents or drafts directly upon the patient.

9. The discharges from the throat, nose, and mouth are liable to communicate the disease, and should be received in vessels containing a strong disinfectant, or on soft rags or pieces of cloth which should immediately be burned.

10. The discharges from the kidneys and bowels should be passed into vessels containing a strong solution of chlorinated lime and then be *buried* at least 100 feet distance from any well; the discharges to be disinfected by thoroughly mixing with each discharge not less than one ounce of chlorinated lime. When this is impracticable, they may be passed on old cloths, which should immediately be burned.

11. The clothing, towels, bed-linen, etc., on removal from the patient, should at once, before removal from the room, be placed in a pail or tub of zinc-solution, made in proportions as follows: water, one gallon; sulphate of zinc, four ounces; common salt, two ounces.

12. Nurses' and attendants' hands should be washed and disinfected by chlorinated soda, their hair, (and beard if any), should receive attention, and their clothing should be disinfected, before they go in public.

13. Every person recovering from whooping-cough should be considered dangerous. The duration of infectiousness may be three weeks before the "whoop" and four or six weeks after apparent recovery; therefore such a person should not be permitted to associate with others, or to attend school, church, or any public assembly until in the judgment of a careful and intelligent health officer he can do so without endangering others; nor until after all his clothing has been thoroughly disinfected. Nor should a person from premises in which there is or has been a case of whooping-cough, attend any school, Sunday school, church, or public assembly, or be permitted by the health authorities or by the school board to do so, until after disinfection of such premises and of the clothing worn by such person, if it shall have been exposed to the contagion of the disease.

14. No public funeral should be held at a house in which there is a case of whooping-cough, nor in which a death from whooping-cough has recently occurred. No child should attend, and it would be better in most cases that few adults attend a funeral of a person dead of whooping-cough.

DISINFECTION OF ROOMS, CLOTHING, ETC.

15. After a death or recovery from whooping-cough, the room in which there has been a case, whether fatal or not, should, with all its contents, be thoroughly disinfected by exposure for several hours to strong fumes of burning sulphur, and then it should for several hours or days be exposed to currents of fresh air.

Rooms to be disinfected must be vacated. Heavy clothing, blankets, bedding and other articles which cannot be treated with the zinc-solution, should be spread out so as to be thoroughly exposed during fumigation, which should take place in the room where the clothing, etc., have been used in connection with the patient. For a room about ten feet square, at least three pounds of sulphur should be used; for larger rooms, proportionately increased quantities, at the rate of three pounds for each 1,000 cubic feet of air space.

Close all openings to the room, place the sulphur in an iron pan supported upon bricks, set it on fire by hot coals or with the aid of a spoonful of alcohol lighted by a match, be careful not to breathe the fumes of the burning sulphur, and when certain the sulphur is burning well, leave the room, close the doors, and allow the room to be closed for several hours.

Care should be taken to secure the complete burning of as much of the sulphur as is possible. To avoid danger of fire the iron pot or pan in which the sulphur is burned should be free from any leak, and it may be placed over water in a tub or pan.

Because of the law of the diffusion of gases, and the numerous crevices through which sulphur fumes may pass, such fumes of sufficient strength do not remain in a room long enough, unless the combustion of sulphur is somewhat rapid. It should not only be rapid, but should continue a considerable time. The best results are obtained by using roll brimstone broken up, or flowers of sulphur, burning the sulphur in shallow pans of sufficient number and size to rapidly fill the room with the fumes, and in quantities sufficient to last for several hours.

Cotton, linen, flannels, blankets, etc., should be treated with the boiling-hot zinc-solution, introducing them piece by piece, securing thorough wetting and boiling for at least half an hour. Heavy woolen clothing, silks, furs, stuffed bed covers, beds and other articles which cannot be treated with the zinc-solution, should be hung in the room during fumigation, pockets being turned inside out and the whole garment being thoroughly exposed. Afterward they should be hung in the open air, beaten and shaken. Carpets are best fumigated on the floor, but should afterward be removed to the open air and thoroughly beaten. In no case should the thorough disinfection of clothing, bedding, etc., be omitted.

16. Hospitals for persons sick with whooping-cough.—Disinfection of a room always necessitates vacating it, and sometimes makes it impossible to remain in adjoining rooms, therefore in some cases it seems essential to have hospital, tent or other temporary shelter for the inmates of infected houses, where bathing, disinfection and washing can be done while such houses are being disinfected and put in order. As a means of preventing the spread of disease, the law* authorizes the inhabitants of townships, cities, and villages to be constantly provided with hospitals for the reception of persons having any disease dangerous to the public health; and such is whooping-cough. The law† requires local boards of health, on the outbreak of any such disease, to provide such hospitals or places of reception for the sick and infected as they shall judge best for their accommodation and the safety of the inhabitants, and to cause such sick or infected persons, if their condition will admit, to be removed to such hospitals or places of reception. Said hospitals, and (in case the sick cannot be removed to the hospital without danger to life or health) the houses where the sick may remain, and all persons connected with said hospitals, or abodes of the sick constituting temporary hospitals, to be subject to the regulations of the board of health, or of a committee appointed by the board of health for that purpose.‡

HOW TO AVOID AND PREVENT WHOOPING-COUGH.

17. Avoid the special contagium of the disease. Do not let a child go near a case of whooping-cough; this is especially important to be observed by guardians of children between one and two years of age. Do not permit any person or thing, or a dog, cat, or other animal to come direct from a case of whooping-cough to a child. Unless your services are needed, keep away from the disease yourself. If you do visit a case, bathe yourself and change and disinfect your clothing before you go where there is a child.

18. Do not permit a child to ride in a hack or other closed carriage in which has been a person sick with whooping-cough, except the carriage has since been thoroughly disinfected with fumes of burning sulphur, as specified in paragraph 15.

19. Do not permit a child to wear or handle clothing worn by a person during sickness or convalescence from whooping-cough.

20. Beware of any person who has a cough with a tendency to become paroxysmal; do not permit a child to kiss, or take the breath of such a person, nor to drink from the same cup, blow the same whistle, or put his pencil or pen in its mouth.

THE AGE AT WHICH MOST DEATHS FROM WHOOPING-COUGH OCCUR.

21. According to the mortality statistics of Michigan for the twenty-four years from 1870 to 1893 inclusive, a little over 95 per cent of all the deaths from whooping-cough were of children under five years of age. Only about 3.6 per cent of all the deaths in those years were of persons of ages from 5 to 10 years, and less than one per cent were of persons of ages from 10 to 20 years.

While the evidence seems to prove that to persons between the ages of ten and twenty years the risk of death from whooping-cough is slight, even that risk need not be taken if the disease be completely restricted.

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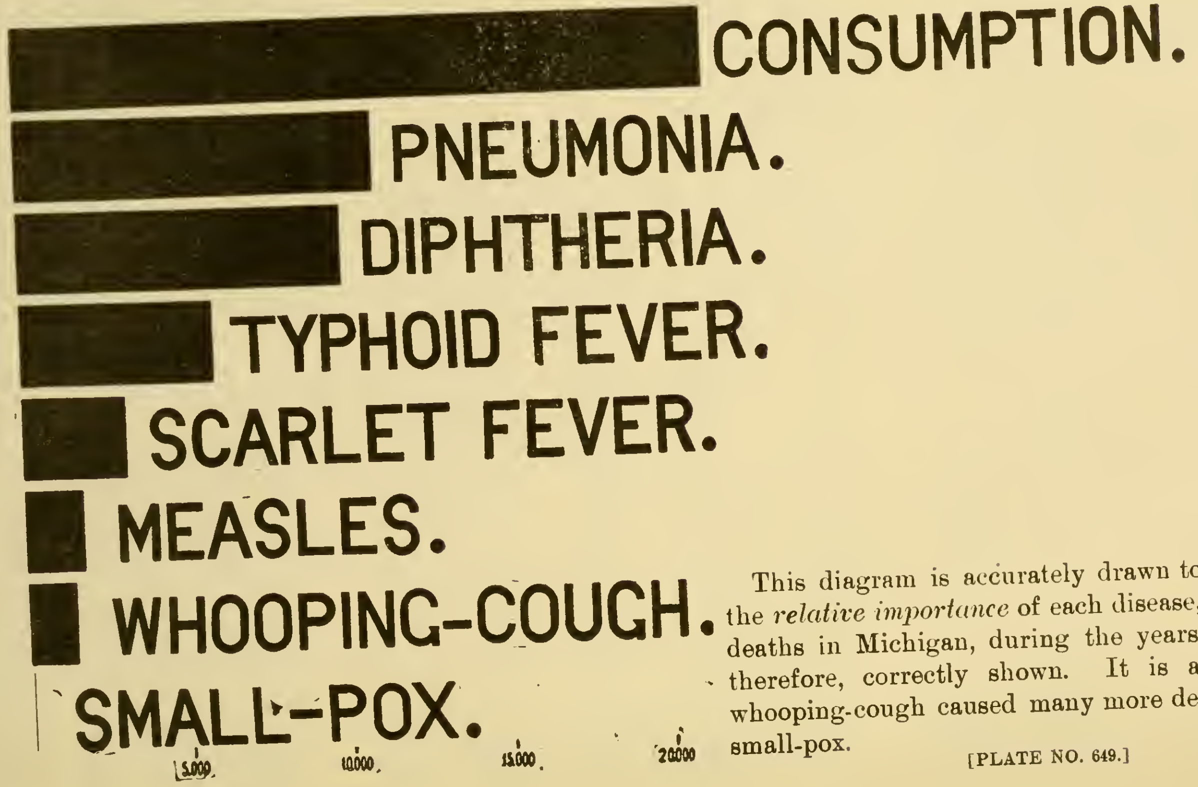
* Sections 1667, 1668, 1670, 1671, and 1874, Howell's Statutes.

† Section 1671, Howell's Statutes.

‡ By amended section 1740 of the Compiled Laws of 1871 (§ 1681 Howell's Statutes), the sections of law relative to townships (Secs. 35-42, of chapter XLVI of the Compiled Laws of 1871) are made to apply to cities and villages.

DEATHS IN MICHIGAN, 10 YEARS, 1884-93.



This diagram is accurately drawn to a scale, and the *relative importance* of each disease, as a cause of deaths in Michigan, during the years specified, is, therefore, correctly shown. It is apparant that whooping-cough caused many more deaths than did small-pox.

[PLATE NO. 649.]

In the present state of our knowledge, it seems important to restrict whooping-cough as completely as possible, and especially so that it shall not reach children in the second year of life.

IMPORTANCE OF RESTRICTING WHOOPING-COUGH.

In Glasgow the annual mortality from whooping-cough for 40 years, 1855–94, was nearly fourteen (13.5) per ten thousand inhabitants, and exceeded those from any other dangerous communicable disease.

In all England and Wales in 1891, the deaths from whooping-cough (13,612), were nearly five (4.68) per ten thousand inhabitants, and exceeded those from measles (12,673), diphtheria (5,036), scarlet fever (4,959) or typhoid fever (4,875).

In Michigan, the *reported* deaths from whooping-cough are several times as many as from small-pox; for the twenty-four years, 1870–1893, they averaged 145 per year. If we assume that only three-fourths of the deaths were reported, the deaths in Michigan from whooping-cough have been about 193 per year. If the inhabitants of Michigan now number two and a quarter millions, and the mortality from whooping-cough were to equal that in England and Wales in 1891, the deaths from that disease in Michigan would equal a little over one thousand per year.

It is claimed that the high mortality in whooping-cough is due to the complications and sequelæ which are said to occur probably in one-third or one-fourth of all cases. If that is true, it would be no extravagance to presume that the mortality from whooping-cough would be still higher if all the deaths directly or indirectly due to it were completely reported, as it is a fact that when a secondary affection attacks, the primary disease is sometimes lost sight of entirely.

According to Dr. Farr's law—of increase of contagious diseases as density of population increases—the death-rate from whooping-cough, unless restrictive measures are taken, will undoubtedly rapidly increase in Michigan with the rapidly increasing population, and especially with the rapidly increasing lines of railroads and other facilities for easy, frequent, and rapid movements of the people. The present very considerable mortality from whooping-cough, and also the much greater mortality which may be expected, supply urgent reasons why the measures herein recommended should be generally and thoroughly adopted and enforced.

This document is published by the State Board of Health, for gratuitous distribution throughout the State. A copy may be obtained by applying to the SECRETARY OF THE STATE BOARD OF HEALTH, LANSING, MICHIGAN.

The State Board of Health recommends that local boards of health procure and distribute copies of this document within their jurisdictions, when whooping-cough is near, and especially to the neighbors of families in which this disease is present.

Meeting of the Washtenaw County Medical Society.—The Regulation of the Practice of Medicine.

On the evening of March 27, the Secretary of this Board attended the meeting of the Washtenaw Co. Medical Society, also, by invitation of Dr. Breakey, the banquet at his residence. The paper of the evening was of practical interest from a sanitary view, and dealt with the subject of the regulation of medical practice. In the discussion which followed the paper, there was set forth the importance of systematic efforts by medical societies to instruct the public on such subjects of vital interest to the people, by securing the publication of such papers in the local newspapers, either as entire papers or in paragraphs and sections, from time to time in a column set apart for such purpose. The rules of the profession seem to prevent such action being taken by individual physicians, so there is apparently great need for such action by medical societies, in order that the people shall recognize the importance of legislation on the subject.

Meeting of the Bay County Medical Society.

February 10, by invitation of the Bay County Medical Society, the Secretary of this Board read a paper before that society at its meeting in West Bay City. The title of the paper was "The State Board of Health.—A finger on the public pulse of two and one-quarter millions of people." The paper seemed to be well received, and was discussed by quite a number of the members of the society.

Meeting of the Michigan Schoolmaster's Club.

March 27, the Secretary of this Board attended a meeting of the Michigan Schoolmaster's Club at Ann Arbor, and listened to an interesting paper entitled "A plea for the teaching of sanitary science in the public schools," by Prof. Delos Fall, member of the State Board of Health. Also to an interesting and convincing discussion of the subject by Prof. Victor C. Vaughan, Director of the State Laboratory of Hygiene, and formerly a member of this Board. This was followed by a short paper on one point connected with this subject, by the Secretary of this Board. The subject was also discussed by Prof. Thompson, Superintendent of the city schools of Saginaw, and by one or two others. Prof. Thompson said he thought the teachers present would have their enthusiasm renewed by the paper and discussions to which they had listened. In conversation afterwards, the president of the club remarked that he thought a great deal of good would result from the presentation of the subject at that meeting.

General statement regarding the work of the Office.

Since the Legislature adjourned and since the Board provided additional clerical aid in the office, the old and regular work has rapidly progressed, and much new and valuable work has been done. Special attention has been paid to bringing up the printing of the annual reports. It is hoped that before the next Legislature convenes the printing on the annual reports of the Board will be up to the requirements of the plan.

Work in Connection with Sickness Statistics.

During the first quarter of 1896, 1,532 blank postal report-cards, 105 record-books, 5 hektographed circular letters and 65 printed circulars regarding weekly card-reports, have been mailed to 148 health officers and regular correspondents; 906 weekly card-reports have been received and entered on the register; 50 copies of the hektographed weekly bulletin, "Health in Michigan," were mailed each week and 110 copies of the monthly bulletin, "Health in Michigan," have been hektographed and mailed each month. These bulletins have been consolidated for this quarterly report. Work has also been done on the compilation of the weekly card-reports of sickness during the year 1894 for the Annual Report for 1885.

Health in Michigan in the First Quarter of 1896. Communicable Diseases.

Compared with the preceding quarter (October, November and December, 1895), reports from all sources show *consumption* to have increased by an average of *sixty-one* places, *typhoid fever* to have decreased by an average of *ninety-three* places, *scarlet fever* to have increased by an average of *nine* places, *diphtheria* to have decreased by an average of *eight* places, *measles* to have increased by an average of *twenty-seven* places, *whooping-cough* to have increased by an average of *fourteen* places. *Small-pox* was reported present at the same average number of places as in the preceding quarter.

Meteorology at one Central Station, and Sickness throughout Michigan from all causes, First Quarter of 1896, Compared with the Preceding Quarter.

A comparison of meteorological conditions of the first quarter of 1896, with the meteorological conditions of the preceding quarter, shows the prevailing direction of the wind to have been southwest (instead of south), the average velocity 1.5 miles per hour greater, the temperature 10.51 degrees lower, the rainfall 2.43 inches less, the absolute humidity considerably less, the relative humidity more, the day ozone less, the night ozone more and the depth of water in the observation well at Lansing one inch more in the first quarter of 1896.

Compared with the preceding quarter (October, November and December, 1895), the reports from regular observers show a marked increase of influenza, pneumonia and pleuritis, and a marked decrease of typhoid fever, intermittent fever, remittent fever and diarrhea in the first quarter of 1896.

The Weather and the Health in Michigan in the First Quarter of 1896, Compared with the Average for the Ten Years, 1886–1895.

A comparison of the meteorological conditions of the first quarter of 1896, with the average for the first quarters in the ten years, 1886-1895, shows that in 1896, the prevailing direction of the wind was the same, (southwest), the velocity was 0.2 of a mile per hour less, the temperature was 0.31 of a degree higher, the rainfall was 0.88 of an inch less, the absolute and relative humidity and the day and night ozone were all less and the depth of water in the well at Lansing was 24 inches less.

Compared with the average in the corresponding quarters in the ten years, 1886-1895, the reports from regular observers indicate that intermittent fever, consumption, inflammation of bowels, remittent fever, diarrhea, erysipelas and pneumonia were less than usually prevalent, and that no disease was more than usually prevalent in the first quarter of 1896.

SECRETARY'S REPORT OF DANGEROUS COMMUNICABLE DISEASES, OF WORK DONE IN THE OFFICE OF THE STATE BOARD OF HEALTH, AND OF THE CONDITION OF HEALTH GENERALLY IN MICHIGAN DURING THE QUARTER ENDING JUNE 30, 1896.

Dangerous Communicable Diseases.

The number of reports of outbreaks of dangerous communicable diseases in Michigan, received from all sources and filed, and the corresponding number concerning which action was taken by this office, during the quarter, are as follows: for diphtheria, 91; for scarlet fever, 98; for typhoid and typho-malarial fever, 79; for measles, 128; for whooping-cough, 56; for small-pox, 0; and for consumption, 89. Total for the seven diseases, 541.

The number of communications relative to dangerous communicable diseases, received and placed on file during the quarter, was 2,297.

Relative to dangerous communicable diseases, letters, written cards, and demands for weekly and final reports on cards, or in the form of the circular letter, were sent out during the quarter to the number of 1,988.

The "final" reports, of outbreaks received and filed during the quarter were: for diphtheria, 84; scarlet fever, 105; typhoid and typho-malarial fever, 68; measles, 21; whooping-cough, 23; small-pox, 7; consumption, 41. Total for the seven diseases, 406.

During the quarter, the local columns of 1,470 newspapers, have been looked over for reports of occurrence of communicable diseases. (This work is done by the clerk who acts as messenger and janitor, in the intervals of his performance of other duties.) This has resulted in giving this office information of the alleged occurrence of 8 outbreaks of diphtheria, 4 outbreaks of scarlet fever, 4 outbreaks of typhoid and typho-malarial fever, 5 outbreaks of measles, 5 outbreaks of whooping-cough and 17 cases of consumption. To what extent the reports of these alleged outbreaks were verified, is shown in the accompanying table:

TABLE 1.—SECOND QUARTER OF 1896.—*Exhibiting the number of outbreaks of Diphtheria, Scarlet fever, Typhoid fever, Measles, Whooping-cough, Small-pox, and Consumption, from April 1, to June 30, 1896, of which notice was received at the office of the Michigan State Board of Health; the per cent of reports, information concerning which was received through the Newspapers; the per cent of newspaper reports which were confirmed by the health officer; the per cent of newspaper reports which were denied by the health officer; and the per cent relative to which no reply was received from the health officer.*

Diseases.	Reports from *all* sources, April 1, to June 30, 1896.	Per cent of all reports which were obtained from the newspapers.	Per cent of newspaper reports which were confirmed by the health officer.	Per cent of newspaper reports which were denied by the health officer.	Per cent of newspaper reports to which the health officer made no reply to notice sent from this office.
Diphtheria	91	9	12	50	38
Scarlet fever	98	4	25	25	50
Typhoid fever	79	5	25	25	50
Measles	128	4	20	40	40
Whooping-cough	56	9	40	40	20
Small-pox	0	0	0	0	0
Consumption	89	19	23	12	65
Averages for the seven diseases		8	23	28	49

No new outbreak of small-pox was reported during the quarter. Final reports have been received from the following outbreaks which began during the first quarter of 1896:—Burlington township, Bay City, Ionia, Imlay township, Marine City and Saginaw, and a partial final report from the city of Detroit.

At this date, July 1, 1896, no small-pox is reported present in the State. The outbreak which began in Detroit in May, 1894, was reported closed during the week ending March 28, 1896, but April 18, 1 new case and 1 death were reported. However, since that date no new case has been reported, and it is safe to assume that the outbreak is over. (From the beginning of the outbreak in May, 1894, until its ending in April, 1896, there have occurred in the city of Detroit 298 cases and 85 deaths.)

Work on Meteorology.

The regular tri-daily meteorological observations have been continued at this Station, and a summary for each week and month during the quarter has been made for use in this Office and in connection with the sickness statistics. At the end of each month, the monthly summary has been sent to the director of the Michigan State Weather Service at Lansing, for his use; it is then sent by him to the Chief of the U. S. Weather Bureau at Washington, D. C.

Ozone test-paper, sufficient to last three months, was sent to 17 meteorological observers for this Board.

Making Diagrams, etc.

Diagrams, to illustrate the annual report, were made as follows:—

"Diagram II.—Av. Daily Range of Temp., by months, 1894."
"Diagram V.—Concerning Fogs in Michigan, in 1894."
"Diagram VI.—Av. Per Cent of Cloudiness, by months, 1894."
"Diagram VII.—Rainfall by months in 1894."
"Diagram VIII.—Ozone, Average by Day, months in 1894."
"Diagram IX.—Ozone, Average by Night, months in 1894."
"Diagram XIII.—Wind, Direction, in Michigan, Av. 12 years, 1878–1889."
"Diagram XIV.—Wind, Direction, in Mich., year and months, 1894."
"Diagram XV.—Wind, Direction, at Stations in Michigan, 1894."
"Weekly reports of Sickness in Michigan in 1894."
"Weekly reports of Sickness in Michigan in 1894."
"Isolation and Disinfection Restricted Diphtheria in Mich. in 1895."
"Relation of Influenza, Tonsillitis and Rheumatism."
"Relation of Influenza, Bronchitis, Pneumonia, Neuralgia, and Pleuritis in Michigan."
"Relation of Atmospheric Temperature to Sickness from Influenza and Pneumonia in Michigan."
"Relation of Wind to Influenza in Michigan."
"Atmospheric Temperature and Influenza in Michigan."
"Relation of Humidity to Influenza.

The average of the daily range of barometer was computed for each of 11 stations for the year 1895.

Meteorological registers were received from each of 12 stations for April, and from each of 14 stations for May, 1896.

Hektograph Work.

Hektograph work to the number of 2,797 pages has been made, including principally 1,110 pages, weekly and monthly bulletins of "Health in Michigan"; 814 pages, proceedings of regular meeting of the Board April 10; 269 pages, circular letter to delinquent health officers relative to annual report; 200 pages, report of examination of plans and specifications for proposed new buildings for the U. P. Asylum for the Insane; 83 pages, circular letter to delinquent card reporters; 70 pages, copy of letter to Hon. Fred A. Maynard, attorney general, relative to distribution of publications to teachers and others under Act 146, laws of 1895; and 65 pages, copy of a letter to Dr. John D. Greenamyer, relative to transportation of consumptive persons and corpses.

Accessions to the Library, Card-Cataloguing, etc.

About 148 books and pamphlets, and some 325 numbers of journals (weeklies, monthlies and quarterlies) have been received and entered in the library accession books.

The work on the card-catalogue of the library has been continued.

Work in connection with the financial accounts of the office has been continued.

Distribution of School Leaflets to Educators.

On request of the Superintendent of Schools of the city of Saginaw, (E. S.) about 400 copies of the leaflet No. 226 were sent for use of the teachers and the more advanced pupils. In response to special requests by teachers there have been sent from the Office some 160 sets of the leaflet publications bearing upon the modes of spreading and the best methods for the restriction and prevention of the most dangerous communicable diseases.

[Under another head in this report will be found a statement of the reason why the Office has not made a more extensive distribution of these leaflets.]

General Distribution of Leaflets, and Diagrams.

About 270 copies of a hektograph abstract of the proceedings of the regular meeting of the Board April 10, were sent to: Sanitary journal exchanges, secretaries of other State Boards of Health, newspapers in Michigan, and members of this Board.

About 2,150 copies of the printed announcement for the Third Annual Conference of Health Officers, at Ann Arbor, July 16 and 17, 1896, have been sent to: Health officers of townships, cities and villages, supervisors of townships where no health officers have been returned, newspapers in Michigan, and sanitarians in this and other States.

About the usual numbers of pamphlets on the restriction and prevention of the dangerous communicable diseases were sent to health officers of localities in which dangerous diseases have been reported. It was at the same time requested of these health officers that the pamphlets be distributed to the *neighbors of persons sick with such diseases* and to other persons likely to be benefitted by the information therein contained. In response to special requests of sanitarians in this and other States and countries, copies of the Annual Report, proceedings of meetings, proceedings of sanitary conventions held in Michigan under the auspices of the State Board of Health, and pamphlets on the restriction and prevention of the dangerous communicable diseases, have been sent where it was thought likely to benefit the public-health interests.

The usual record of distribution of leaflets, etc., has been made.

List of Supervisors in Michigan for 1896–97.

As fast as the names of supervisors for 1896–97 were returned to the office of the Secretary of State, a list was made in this Office for official use throughout the year.

Secretary's Report of Property for year ending June 30, 1896.

In compliance with the by-laws of this Board, the secretary has prepared a report of the "Nature and amount of property belonging to the Board, which has been received, issued, expended, and destroyed since the last report (of property), and of the property remaining on hand, and also in whose care each item of property is intrusted" for the fiscal year ending June 30, 1896.

Return of the Names and Addresses of Health Officers for 1896–97.

There have been returned to this Office the names and post-office addresses of 1,354 health officers of townships, cities, and villages, the name and address of each have been recorded in the books for that purpose, and the return has been placed on file. To each of 460 health officers who did not serve last year there have been sent a set of pamphlets relating to the restriction and prevention of the dangerous communicable diseases, two copies of the outbreak report blank, one copy of the weekly report blank, and one sample copy of a blank to be used in keeping a local record of the cases of diseases dangerous to the public health.

On May 28 and 29 a second demand, for the return of the name and address of the health officer, was made on each of 681 clerks of townships, cities, and villages, from which no return of health officer had been received.

Compiling, Editing, Proof-reading, Printing, etc.

The compilation of reports from all sources relative to "Scarlet Fever in Michigan in 1894" has been completed and the compilation proved. "Typhoid Fever in Michigan in 1894" has been compiled and the compilation nearly proved. The compilation of "Measles in Michigan in 1894" is about two-thirds made. The compilation of "Small-pox in Michigan in 1894" has been made, and the proving has been commenced. The material relative to "Consumption in Michigan in 1894" is nearly compiled and the compilation of material relative to "Nuisances", "Illuminating Oils", and "Whooping-cough" have been made. The article on "Meteorological Conditions in Michigan in 1894" has been prepared and is ready for the printer.

The index for the Annual Report for 1894 has been made and proved. The articles relative to "Diphtheria in Michigan in 1894" and relative to "Scarlet Fever in Michigan in 1894" have been written, and made ready for the printer. The articles on "Rabies in Michigan in 1894", "Glanders in Michigan in 1894", and on "Illuminating Oils in Michigan in 1894" have been written, and the article on "Nuisances in Michigan in 1894" has been partly written.

Proof has been read for the Annual Report for 1894 on the following subjects: Measles, small-pox, chicken-pox, cholera infantum, consumption, typhus fever, cholera, cholera morbus, rothëln, mumps, puerperal fever, erysipelas, removal of dead bodies, tyrotoxicon poisoning, trichiniasis, glanders, rabies, lumpy-jaw, injuries and loss of life and property from the use of kerosene and gasoline, alleged nuisances, and the index. Proof has also been read on "Part I" of the Annual Report of the secretary for 1894.

Third Annual Conference of Michigan Health Officers.

During the quarter considerable time has been devoted to making arrangements for the Third Annual Conference of Michigan Health Officers at the State Laboratory of Hygiene, Ann Arbor, July 16 and 17, 1896. An announcement has been prepared, printed, and widely distributed, and a program has been arranged and is ready for the printer.

Meeting of the State Medical Society.

The secretary attended and read a paper before the meeting of the State Medical Society, at Mt. Clemens, June 4 and 5, 1896, on "Etiology and Pathology of Typhoid Fever." As the secretary was a delegate from this Board, he will make a written report of his attendance at this meeting.

National Conference of State Boards of Health.

The meeting of the National Conference of State Boards of Health occurred in Chicago, June 10 and 11, and the secretary prepared and read two papers; one paper was entitled "How to Obtain the Vital Statistics of a State", the other paper was entitled "Recent Sanitary Progress in Michigan." As the secretary represented the Michigan State Board of Health at the Conference, he will make a written report of his attendance at the meeting.

Printing Leaflets, Pamphlets, Diagrams, etc.

Not much printing has been done during this quarter because of the limited amount of money on hand for use in 1896.

In June 2,000 copies of the two-page leaflet "Chart I" on one side, and "Chart II" on the other side, were printed for distribution.

In June 1,000 copies of (plate 780) "Typhoid Fever in Michigan in 1893" were printed for distribution.

A revised edition (second) of the time slip was printed to the number of 2,000 copies.

Immigrants, exposed to measles, who settled in Michigan.—Notices to the State Board of Health, and by the State Board to local health officers.

During the quarter ending June 30, 1896, 25 notices were received from Dr. Joseph H. Senner, U. S. Commissioner of Immigrants at New York City, containing lists of names and destinations of immigrants exposed to some dangerous communicable diseases, stating that *measles* had occurred on board 24 steamships, and *measles* and *small-pox* on board 1 steamship arriving at New York; all of these 25 steamships had on board passengers intending to settle in Michigan. Copies of these notices (sixty-two in all) were made and forwarded to the health officers of the several places for which the immigrants were destined.

Distribution of Information, under Act 146, laws of 1895.

Act 146, laws of 1895, requires the State Board of Health annually to send to the school teachers throughout Michigan data and statements to enable them to teach the modes by which the most dangerous communicable diseases are spread and the best measures for the restriction and prevention of each of these diseases. The Office has done this for the school year 1895-6, but in doing so has been obliged to stop work required under other laws. It is now time to commence the distribution for the school year 1896-97, but there is no money available for that purpose. There being no appropriation made for complying with act 146, laws of 1895, the Board of State Auditors were asked to allow a bill for expenses incurred in complying with the provisions of act 146, for the school year 1895-96. This the Board of State Auditors declined to do. The Board of State Auditors were then asked to request an opinion by the Attorney General on the question whether or not they could allow the bill under the provisions of section 4, article eight, Constitution of Michigan. This the Board of State Auditors also declined to do; in fact they declined to give the subject any further consideration. This means that the school law and some other laws cannot be fulfilled, because the six thousand dollars appropriations for the use of the State Board of Health are now almost entirely exhausted for the calendar year 1896. Except to persons who send the postage, the office will not be able to make the distribution of the twenty-second annual report which has just been received from the printer.

Annual Reports from Health Officers and Clerks.

Annual reports, of diseases present in 1895, have been received from 176 health officers and 121 clerks. Probably most of these reports were received in response to a "third" request which was sent from the Office April 3 and April 14, to 24 health officers and 47 clerks of cities, 256 health officers of townships and villages, to 221 clerks of townships, and to 130 clerks of villages. With each "third" request made April 14, to health officers the following circular letter was sent:—

(1664)

OFFICE OF THE SECRETARY OF THE MICHIGAN STATE BOARD OF HEALTH,
Lansing, April 14, 1896.

To a Delinquent Health Officer:—

DEAR SIR:—At the regular meeting of the State Board of Health, at Lansing, April 10, 1896, reports by the Attorney General, Judge McAlvay, and the Secretary of the Board, (who read a letter from health officer Duffield) showed that the annual report of the health officer of Detroit, is being made out, and may be expected in a few days. The Board voted to direct the Secretary to request each health officer from whom no annual report has been received for the year 1895, to make such report immediately, in accordance with State law, or proceedings would be commenced against such delinquent officer.

Very respectfully,

HENRY B. BAKER,
Secretary.

Health officers delinquent July 1, 1896: townships 115, cities 14, and villages 70.

Clerks delinquent at close of quarter: townships 164, cities 36 and villages 89.

Total number of jurisdictions from which no annual report has been received from either health officer or clerk: townships 43, cities 13, villages 30. Total 86.

The annual reports from health officers and clerks have been arranged alphabetically by counties and jurisdictions, and the compilation of the data contained therein has been commenced.

Return of the Names, etc. of Medical Practitioners.

Returns of the names, address, sex, age, etc., of medical practitioners have been received from 65 clerks of townships, cities and villages. The total number received from Jan. 1 to June 30, 1896, is 566.

Work in Connection with Sickness Statistics.

During the second quarter of 1896, 4,159 blank postal-report cards, 292 record books, 298 printed circular letters, and 62 hektographed circulars and letters regarding weekly card-reports, have been mailed to 304 health officers and regular correspondents; 2,018 weekly card-reports have been received and entered on the register; 50 copies of the hektographed weekly bulletin "Health in Michigan" were mailed each week, and 110 copies of the hektographed monthly bulletin "Health in Michigan" were mailed each month. These bulletins have been consolidated for this quarterly report. The compilation of the weekly card-reports of sickness during the year 1894, for the Annual Report for 1895, has made considerable progress and is nearing completion.

Health in Michigan in the Second Quarter of 1896. Communicable Diseases.

Compared with the preceding quarter (January, February, and March), reports from all sources show *measles* to have increased by an average of *thirty-two* places per month, *consumption* to have increased by an average of *twenty-seven* places per month, *typhoid fever* to have decreased by an average of *nineteen* places per month, *diphtheria* to have decreased by an average of *eighteen* places per month, *scarlet fever* to have decreased by an average of *fifteen* places per month, *whooping-cough* to have decreased by an average of *two* places per month, and *small-pox* to have decreased by an average of *two* places per month, in the second quarter of 1896.

Meteorology and Sickness from All Causes, Second Quarter of 1896, Compared with the Preceding Quarter.

A comparison of the meteorological conditions at Lansing, of the second quarter of 1896, with the meteorological conditions of the preceding quarter, shows the prevailing direction of the wind to have been southeast (instead of southwest), the average velocity .6 of a mile per hour less, the temperature 36.25 degrees higher, the rainfall 1.59 inches more, the absolute humidity much more, the relative humidity less, the day and night ozone more, and the depth of water in the observation well 3 inches more.

Compared with the preceding quarter (January, February, and March), the reports from regular observers show a marked increase of cholera morbus, dysentery, intermittent fever, measles, inflammation of bowels, and diarrhea, and a marked decrease of typhoid fever, diphtheria, influenza, pneumonia, and scarlet fever in the second quarter of 1896.

The Weather and the Health in Michigan in the Second Quarter of 1896, Compared with the Average for the Corresponding Second Quarters in the ten years, 1886–1895.

A comparison of the meteorological conditions at Lansing, of the second quarter of 1896, with the average for the second quarters in the ten years, 1886–1895, shows that in 1896 the prevailing direction of the wind was southeast (instead of southwest), the velocity 1.1 miles per hour greater, the temperature 4.91 degrees higher, the rainfall .42 of an inch less, the absolute humidity more, the relative humidity and the day and night ozone all less, and the depth of water in the observation well 25 inches less.

Compared with the average in the corresponding quarters in the ten years, 1886–1895, the reports from regular observers indicate that consumption, remittent fever, erysipelas, pneumonia, scarlet fever, and intermittent fever were less than usually prevalent in the second quarter of 1896. No disease was more than usually prevalent in this quarter.

GENERAL REPORT OF WORK IN THE OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH DURING THE FISCAL YEAR ENDING JUNE 30, 1896.

Much of the work of the Office naturally groups itself under three heads—the collection of information, the compilation and elaboration of information, and the dissemination of information. In the following outline that grouping is adhered to so far as is practicable without repetition.

COLLECTION AND COMPILATION OF INFORMATION.

RETURNS OF NAMES AND POSTOFFICE ADDRESSES OF HEALTH OFFICERS.

There is a local board of health in every township, and in every incorporated city and village in Michigan.

Every local board of health in Michigan is required by law to appoint and constantly have a health officer, and to report his name and address to the Secretary of the State Board of Health at Lansing.

Blanks for the return of the names and addresses of health officers are sent out by the Secretary of the State Board of Health to the local officers about the first day of April, the law (§ 1634 Howell's Statutes) requiring the appointment and return to be made "within thirty days after the annual township meeting in each year."

In the secretary's quarterly report of work done during the second quarter of 1896, printed on preceding pages (lxxviii, xci) of this volume, is an account of the collection of this information relative to health officers in Michigan in 1896–97.

In April, 1896, the usual demand was made upon supervisors of townships, presidents and clerks of villages, and mayors and clerks of cities, for the return of names and postoffice addresses of health officers to serve in 1896–97. The circular and blank forms are similar to those printed on pages xiii–xiv of the Report of this Board for 1884. In June, 1896, a second demand was sent to localities from which no return had been made in response to the demand in April. On the outbreak of a dangerous communicable disease in a township, city or village in which no health officer had been reported, a third and even a fourth demand for the appointment of such officer, and the return of his name has been made; therefore the number of health officers returned increases until the close of the year for which such officers are appointed. At the close of the fiscal year 1896, June 30, 1896, the numbers for townships, cities and villages were stated in the quarterly report of this Office, printed on a preceding page.

Through the systems of reports to the State Board of Health by its corps of correspondents, as well as by the local health officers, and by a systematic searching of the local columns of the country newspapers published in Michigan, the secretary of the State Board often receives information of an outbreak of a communicable disease, and desires to communicate at once with the health officer; but if no health officer has been appointed in that locality, or no return of such appointment has been made, delay occurs, and before the secretary of the State Board can get into correspondence with the delinquent local board of health and a health officer can be chosen, the disease may spread widely within or without the limits of the village or township, with unnecessary sickness and loss of life. It should be said, however, that there is an increasing tendency to comply with this law, and local boards now generally act promptly and coöperate cordially with the State Board of Health in its endeavors to prevent the spread of dangerous communicable diseases.

SPECIAL REPORTS RELATIVE TO DANGEROUS COMMUNICABLE DISEASES.

Every health officer is supplied with blanks "L" from this office, for reporting outbreaks of diphtheria, typhoid fever, scarlet fever, small-pox, measles, etc. (dangerous communicable diseases) to the secretary of the State Board of Health, as required by law.

Upon the receipt of the report of an outbreak of such disease, blank "M" for weekly reports during the outbreak, are sent, with a circular letter ("Blue Letter"), also a number of pamphlets containing instructions for the suppression of the disease. These pamphlets are to be distributed to the neighbors of the family in which the disease is, in order to obtain their coöperation with the health officer.

About 2,311 outbreaks of such diseases were thus attended to during the fiscal year ending June 30, 1896.

Later, a blank is sent to the health officer of each such locality for a final report at the close of the outbreak, stating just what was done for the restriction of the disease, and with what result,—the number of cases and deaths, households invaded, what disinfectants were used, what exceptions, and other facts supplying important data for guidance of future efforts.

The facts thus collected are compiled for publication in the Annual Report of the Secretary of the State Board of Health. In this Annual Report will be found the report of such facts relative to the dangerous communicable diseases in Michigan during the year 1895.

SICKNESS STATISTICS, WEEKLY POSTAL-CARD REPORTS OF ALL IMPORTANT DISEASES, IN 1895.

The weekly postal-card reports of diseases, on cards furnished by the State Board of Health, have been received from health officers of cities and villages and other leading physicians in active general practice who contribute this valuable information from different parts of the State. The plan of these weekly card-reports is stated in an article commencing on or about page 81 of this Report; on or about page 83 is an example of these reports properly filled out. When a report of a new health officer of a city or village is received, a printed letter number [81] or [180], with a circular [94] or [129] describing the plan of the reports, and transmitting supplies for making them, is sent to said health officer.

A list of observers of diseases for the calendar year 1895, and a compilation of their reports, with a study of relations of sickness to climatic conditions is printed in this Report, commencing on or about page 81. The sickness statistics of Michigan, based upon these weekly reports by the leading physicians in the State, are probably the most important sickness statistics in the world.

The sickness statistics are made especially useful for the purpose of studying the causation of diseases, by reason of the excellent system of meteorological statistics which have been collected during such a long series of years as to make them exceedingly useful for such purposes.

ANNUAL REPORTS BY HEALTH OFFICERS FOR THE YEAR ENDING DEC. 31, 1895.

In January, 1896, a circular [218] was sent to the health officer of each township, city and village in the State, about 1,581 in all, transmitting a blank form [I] for use in making his annual report to this office. This circular was substantially the same as circular [65] which is printed on pages viii-ix of the Report for 1884. Blank form [I], for reports of health officers, is printed in former Reports. With the circular [218] was also transmitted a blank for a copy of a record of diseases dangerous to the public health, similar to the blank which is printed, reduced in size, on page 271 of the Report for 1882.

Where the name of the health officer has not been returned to this office, the blanks were sent to the president of the village, the mayor of the city, or the supervisor of the township, according as the vacancy occurred in a village, city, or township.

ANNUAL REPORTS BY CLERKS OF LOCAL BOARDS OF HEALTH FOR THE YEAR ENDING DEC. 31, 1895.

At the same time (January, 1896) that the circulars and blank forms were sent to the health officers, a circular [217] asking for a report, and a blank form [J] on which to make a report, were sent to the clerk of the local board of health of each township, city and village in the State, about 1,581 in all. A blank form for a copy of his record of cases of diseases dangerous to the public health was also sent; the circular and blank form sent to the clerk were similar to those sent to the health officer, except that they were not so explicit in questions relating to sickness and deaths.

RETURN OF NAMES OF MEDICAL PRACTITIONERS.

About January 1, 1896, blanks for the return of names of medical practitioners were sent to each of the clerks of the townships, cities, and villages, about 1,581 in number. An example of these blanks is printed on page XI of the Report of this Board for 1888.

METEOROLOGICAL REPORTS.

A list of meteorological observers for the calendar year 1895, with a statement of what registers were received from each, is printed in this Report.

The reports are summarized in an article in this Report on the Principal Meteorological Conditions in Michigan in the year 1895, commencing on page 1. The data are of great value for the purposes of studying the causes of diseases The observations made at the office of the Board, at Lansing, have been summarized weekly, and a copy kept on file in the Office.

DISSEMINATION OF INFORMATION.

PUBLISHED LIST OF NAMES AND ADDRESSES OF HEALTH OFFICERS.

The names and addresses of 1,511 health officers in Michigan, to serve in 1896–97, were collected and recorded in the Office; but, for lack of appropriation, the customary list of these health officers was not printed. During the last quarter of 1895 a hektograph list of health officers serving in 1895–6, was made, for use of members of this Board and for use in the Office. As fast as the names and addresses of health officers were received in 1896, this list was amended so as to give the names and addresses of health officers to serve in 1896–7.

DISTRIBUTION OF INFORMATION HOW TO PREVENT AND RESTRICT DANGEROUS DISEASES.

Whenever information was received of the first occurrence of diphtheria, scarlet fever, typhoid fever or typho-malarial fever, measles, whooping-cough, consumption, or small-pox, copies of a document on the restriction and prevention of the disease reported were immediately sent to the health officer, with a request that he distribute them where they will be likely to be read, and it is suggested that the neighbors of those families in which the sickness occurs would be most likely to read them at such times of danger; and it is thought that after reading them they will be most likely to coöperate with the local health officer for the restriction of the diseases. Thousands of pamphlets on each of the most dangerous communicable diseases are distributed by the State Board in this manner—in localities where the disease treated of in the pamphlet is present. They are being distributed in this way all the time, because there is no time when the State is free from scarlet fever or diphtheria, these being among the most important of the dangerous communicable diseases in Michigan. Copies of the documents on diphtheria, scarlet fever, and small-pox, in German or in Dutch, are also sent when it is thought they can be used to advantage. Owing to frequent requests for documents in French, Polish, Swedish, and Danish-Norwegian, translations of a leaflet on contagious diseases [47] have been made into each of these languages, and copies are sent to local boards of health when requested.

A record is kept of reports received, and of correspondence relative to each outbreak of a dangerous communicable disease of which the Office receives information. A compilation of such information relative to several of the most important diseases is published in this volume.

PRINTING AND DISTRIBUTION OF THE SECRETARY'S ANNUAL REPORT.

Comparatively few copies of the Annual Report of the Secretary are published. The whole number published is not as large as the whole number of officers and members of local boards of health in Michigan. Only about six thousand copies of the Reports are published for all purposes. Only a little over half of these (3,500 copies) are at the disposal of the State Board of Health. These reports are used in exchange with sanitary journals, with other State Boards of Health, with city boards of health in other States, and with health officials in other countries, with libraries, and to physicians in Michigan who contribute to the work of the Board. Michigan is a great and prosperous State, and it is believed that it is made richer, not poorer, by the influences exerted by the publications of the Michigan State Board of Health.

PRINTING AND REPRINTING LEAFLETS, PAMPHLETS, DIAGRAMS, ETC., OF INFORMATION.

Heretofore it has been customary in this connection to mention printing and reprinting leaflets, pamphlets, diagrams, etc.; but, during the fiscal year ending June 30, 1896, a quarterly statement was made, and will be found printed in the secretary's quarterly reports of work in the office. This particular portion of the quarterly reports will be found printed on pages xliv–liii, of this volume.

INSTRUCTIONS TO NEWLY-APPOINTED HEALTH OFFICERS.

As fast as the names and addresses of health officers to serve in 1896 and 1897 were received, a copy of the pamphlet [120] detailing the duties of health officers, was sent to each one who had not served during the preceding year, together with blanks "L" for the prompt report of any dangerous communicable diseases, and sample copies of pamphlets on the restriction and prevention of diphtheria, scarlet fever, typhoid fever, measles, whooping-cough, and consumption; also a slip [224] relative to consumption being a dangerous disease and short statements relative to its prevention and restriction; and a leaflet [226] on the "Restriction and Prevention of Dangerous Communicable Diseases." Several leaflet diagrams among which were two, one exhibiting the experience in Michigan in 1891 and 1893, in restricting scarlet fever, the other exhibiting the experience in restricting diphtheria during the years 1891 and 1892. The pamphlet containing the laws relating to the public health which were in force in Michigan in 1890 was so nearly out of print that it was not sent, except in exceptional cases.

HEALTH BULLETINS, WEEKLY AND MONTHLY, AND QUARTERLY REPORTS.

The weekly reports of diseases received up to Wednesday of the week following the week for which they are made, are compiled on that day, week by week, and a bulletin, based on that compilation, is sent to each member of the State Board of Health, and to others interested in keeping a "finger on the public pulse", also to a number of newspapers, and to sanitary and medical journals. A specimen of this weekly health bulletin can be found on page xii of the Report for 1884, and on page lxxxix of the Report for 1894.

This subject of dissemination of information by means of bulletins is treated of in the article on "Time of Greatest Prevalence of each Disease" in this volume, commencing on or about page 81.

Beginning with the month of August, 1884, a *monthly* health bulletin has been issued immediately after the close of each month, for the use of members of the State Board of Health and others who are studying the subject. These bulletins are mailed to sanitary and medical journals. Beginning with the bulletin for the month of September, 1889, a third column was added, being the average for the bulletin month in a preceding series of years, beginning with the year 1886. This enables the reader to study and compare the prevalence of each disease in the last preceding month with the same disease in the corresponding month in the preceding series of years. An example of this form of bulletin is printed on pages xlv-xlvi, of the Report for 1890, and on pages xcii-xciii of the Report for 1894.

At the close of each quarter these monthly bulletins are consolidated for the secretary's "Quarterly Report of work in the Office, and statement of the conditions of health generally in Michigan", comparing the communicable diseases during the quarter just closed with the preceding quarter, to learn their increase and decrease; including also the meteorological conditions, and the sickness from all causes compared with the preceding quarter and with the average for corresponding quarters for the series of years beginning with 1886.

Beginning with January, 1890, and ending with February, 1891, a supplementary bulletin was prepared representing graphically the relative amount of sickness from each of the principal diseases in the month for which the bulletin was issued. This was sent with the regular monthly bulletin for the same month. A sample of this graphic bulletin is printed on page xlvii of the Report for 1890, and one is printed on page 85 of the Report for 1891.

DIAGRAMS OF INSTRUCTIVE EXPERIENCE IN MICHIGAN.

Two diagrams, "Isolation and Disinfection Restrict Diphtheria," and "Isolation and Disinfection Restrict Scarlet Fever" have been printed, and many hundreds of them distributed as heretofore mentioned. They exhibit, in a condensed form, the experience of the health officers in Michigan, with these two important diseases, relative to scarlet fever in 1890 and 1891, and diphtheria in 1889 and 1891. The evidence in them is similar to that in similar diagrams which have been published for other years; therefore the evidence gains greatly in strength. They prove that in those localities in which isolation and disinfection are enforced the deaths from scarlet fever and diphtheria are only about one-fifth as many as there are in localities where these measures are not enforced.

ABSTRACTS OF PROCEEDINGS OF MEETINGS OF THE STATE BOARD.

Abstracts and brief accounts, of the proceedings of meetings of the State Board of Health are prepared, hektographed or printed, and distributed as soon as practicable after the meeting. During this year, however, because of lack of means, not any of these abstracts were printed in pamphlet form. (Abstracts of the minutes of meetings are printed on preceding pages of this Report.) The distribution of these abstracts is not the same for all meetings, being to a different class of persons, according to the nature of the contents, in some instances being sent to sanitary and medical journals, in other instances to teachers, health officers and others.

SECRETARY'S QUARTERLY REPORTS OF WORK IN THE OFFICE.

At the close of each quarter, the secretary prepares a brief report of work done in the office. This report is presented and portions of it generally read at the next regular or special meeting; and, if the abstract of the proceedings of the meeting is printed, this report is printed in the same pamphlet.

REPRINTS.

Reprints of articles in the Report and in proceedings of Sanitary Conventions, have been made in pamphlet form, and sent in answer to queries, in letters, that can best be answered in that manner. For instance, many reprints of the article relative to alleged nuisances in the preceding year have been thus sent out, in response to questions.

SYSTEMATIC STUDY OF NATURAL WATERS OF MICHIGAN STREAMS, SPRINGS AND WELLS.

PRESENTED TO THE STATE BOARD OF HEALTH AT ITS REGULAR MEETING, JANUARY 10, 1896, BY HENRY B. BAKER, M. D., SECRETARY.

Prof. F. S. Kedzie, of the Chemical Department, Michigan State Agricultural College, suggests a systematic study of the natural waters of the Michigan streams.

The great drouth during the past few years, and especially during the last year, has forced many people to obtain their supplies of drinking water from streams. In the past, and probably in the future, streams will be called upon to supply the water for some cities and villages. The question as to the safety of such water supplies is an important one which sanitarians and chemists are not properly prepared to meet. Are the vast amounts of sewage and other contaminating substances which find their way into the streams, oxidized and rendered innocuous, or are they so contaminating the streams as to make it dangerous to use such water in cities and villages? Are the dangers to life greater in times of drouth than at other times? How far below a city situated on the bank of a stream do these contaminations of the water which are dangerous to life and health extend? To properly answer such questions, such a systematic study should have been commenced years ago. Should it not be commenced at once?

When this subject was put before the secretary of this Board a few years ago, his reply was that the State Board of Health could not, from its meager appropriations, spare anything for this investigation. Prof. Kedzie now suggests methods whereby it is hoped that the study may be commenced in a comparatively inexpensive manner, and the work divided up, some portion of it allotted to each of the many laboratories in Michigan. He suggests that the regular correspondents of the State Board of Health be asked to make the collections of the water, that students at different colleges be employed in these investigations under the direction of their expert teachers, and that the State Board of Health pay, out of its small appropriation to pay the salary of the secretary, etc., for the jugs or other receptacles of the water, also the express charges, and such other expenses as shall be required. He asks that the secretary present this subject to the State Board of Health; also the question, relative to each sample of water,—what shall be determined?

A year or two ago Prof. Fall, of this Board, proposed to determine the amount of chlorine in the natural waters in springs in different parts of Michigan. This should be done for the streams; also the amount of organic matter; perhaps, also, the presence or absence of pathogenic bacteria. If this last item is to be undertaken, probably it could best be done at the State Laboratory of Hygiene. Other branches of the work might be done at other laboratories, and perhaps bacteriological laboratories may well be started at several of the colleges in Michigan; it is understood that one will soon be established at the State Agricultural College.

Prof. Kedzie mentioned an investigation by a student at the Agricultural College of the amount of chlorine in the farmers' wells, in one locality in Michigan. It would be an interesting item of information if this question could be answered for a great many localities in Michigan.

Two or three modes of procedure suggest themselves,—(1) reference to a committee for investigation and report; (2) an appropriation of a definite amount to be expended, and the immediate entrance upon the work. Accordingly, I have now presented the subject for your consideration.*

HENRY B. BAKER.

DISTRIBUTION OF COMMUNICABLE-DISEASE LITERATURE TO THE PUBLIC SCHOOL TEACHERS, UNDER ACT NO. 146, LAWS OF 1895.

REPORT SUBMITTED TO THE MICHIGAN STATE BOARD OF HEALTH APRIL 10, 1896, BY HENRY B. BAKER, M. D., SECRETARY.

During the quarter ending March 31, 1896, the work of distributing health literature among the teachers of Michigan progressed rapidly, and is practically completed for the school year. To 50 county school commissioners, 5,473 sets of publications were sent out for distribution among the village and district school teachers of those 50 counties. To 17 superintendents of city schools, 263 sets of publications were sent for distribution among the teachers of those 17 cities. At the personal request of teachers and others to this Office, 492 sets were sent out. To the Superintendent of Public Instruction, 1,900 sets were delivered for distribution at 9 county institutes. The foregoing makes a total distribution during the first quarter of 1896 of 8,128 sets.

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*This subject was discussed and referred to Prof. Fall, committee on water supply.

Distribution during the School Year, 1895–6.

In the summer of 1895, before Act No. 146, Laws of 1895, took effect, the Secretary of the State Board of Health had a conference with the Deputy Superintendent of Public Instruction, and later with the Superintendent, Hon. H. R. Pattengill, who agreed that everything practicable should be done to fulfill the intent of the law, as of any other school law. They advised that as soon as the State Board of Health should complete the "data and statements" required to be supplied by it to the teachers, copies of the documents should be distributed at teachers' institutes to all teachers in attendance, and from the first, the Department of Public Instruction has kindly continued to attend to such distributions. The State Board of Health supplied to the Department of Public Instruction several thousand copies of each of the leaflets Nos. 226 and 227. Subsequently that Department had a large number printed. Nearly all these were circulated to teachers in attendance at teachers' institutes, thus giving the movement an impetus, and paving the way for the work of the State Board of Health.

The plan recommended by the Department of Public Instruction, and adopted by the office of this Board to effect a more complete distribution among the teachers through the coöperation of the county commissioners and the city superintendents of schools, seems to have proved a success; and the hearty support which the State Board of Health has received from the county commissioners and city superintendents, and the many letters from teachers, demonstrate that the law finds a popular and cordial response among the teachers, school officers, and educators throughout the State. Certainly there is no branch of education that should call for a more earnest effort on the part of educators than that of instilling, in the youthful mind, knowledge of the subject of health and self-preservation.

In November, 1895, the special leaflets, issued by the State Board of Health, on all the dangerous communicable diseases, were arranged into sets. One set of these leaflets was sent to each of the 83 county school commissioners, and to each of the 76 superintendents of city schools. Each set was accompanied by a circular letter asking the coöperation of the Commissioners and Superintendents in a distribution of the sets among the teachers under their respective jurisdictions. Responses came rapidly; each expressing hearty approval of the spirit of the law, and offering assistance to any plan by which their teachers could be reached. In nearly every case, sets were sent by express, charges prepaid, to the county commissioners and city superintendents, for distribution by them among the teachers in their respective jurisdictions.

A summary of the distribution for the present school year is as follows:—

At the request or by the consent and coöperation of 82 of the 83 county school commissioners (being every one except Gladwin) in Michigan, 12,079 sets were sent for distribution among the teachers of the village and the district schools. Through the kindness of Supt. Jos. W. Howell, of the Gladwin city schools, the teachers of Gladwin Co. were supplied, thus completing the distribution in that manner.

At the request, or by the consent and coöperation of the 76 superintendents of city schools in Michigan, 3,953 sets were sent for distribution among the teachers in the city schools. Thus each teacher was supplied with a set of these publications.

At the personal request of many teachers and others in Michigan, 738 sets were sent out. These were principally for the use of pupils in classes, where a more persistent study of this important subject was made.

In addition to 1,900 sets supplied by this Office to the Department of Public Instruction for distribution by that Department among the teachers in attendance at 9 county institutes, several thousands copies of leaflet No. 226, were supplied that Department for distribution in the fall of 1895.

At the State Teachers' Association, held in Lansing, in December, 1895, 375 sets were distributed.

The executive of this Board is greatly indebted to the Department of Public Instruction for assisting this department to effect this distribution. The county commissioners of schools and superintendents of city schools, also, have rendered invaluable aid to this Office in enabling it to so fully carry out the intention of the law, so far as relates to the distribution of the "data and statements" supplied by this Board to the teachers.

In closing this report of the completion of the work on this subject for the school year 1895-6, it may be stated that, according to statistics in the office of the Superintendent of Public Instruction, there are, at present, engaged in teaching in Michigan, about 16,000 teachers; and during the present school year, 19,045 sets of publications on communicable diseases, including in each set the "data and statements", required by Act No. 146, Laws of 1895, have been sent from this Office to educators in this State.

MEETING OF STATE MEDICAL SOCIETY, MT. CLEMENS, JUNE 4 AND 5, 1896.

REPORT OF DELEGATE FROM STATE BOARD OF HEALTH.

To the President and Members of the Michigan State Board of Health:

GENTLEMEN: The thirty-first annual meeting of the Michigan State Medical Society was held in the city of Mt. Clemens, June 4 and 5, 1896. The meeting was successful, the attendance being good, and the amount of scientific work done rather more than the average.

Among nearly eighty papers presented, very few dealt with sanitary subjects. Those of special interest to the board were:

1. The address of the president of the society, Dr. Victor C. Vaughan, a former member of this board, subject " William Beaumont and His Work." This was a scholarly paper treating of the life and researches of a man who did much under adverse circumstances for the development of the science of physiology. Much of this work was done in Michigan.

2. A paper on the " Etiology and Pathology of Typhoid Fever " by Dr. Henry B. Baker, the secretary of this board. Doctor Baker's paper was a very exhaustive treatise on the subject, and added to it as an appendix was a tabulated statement of one hundred and forty-seven outbreaks of typhoid fever traced to milk infection. The data relating to nine of these outbreaks were collected by Dr. Baker.

3. The discussion of a paper which had for its subject, " Questions Concerning the Etiology and Prevention of Pulmonary Consumption." Participating in this discussion, Dr. Baker clearly pointed out that while

the bacillus tuberculosis was the specific cause of consumption, other factors entered into its causation, and that climatic conditions almost absolutely control the disease, it being unmistakably true that the increase and decrease of tuberculosis invariably follow the changes in the climatic conditions. And this fact stamps tuberculosis as a communicable disease, for the same thing is true of small-pox, scarlet fever, diphtheria and every disease that gains access to the system through the air passages.

In answer to some criticisms of the law in this State relative to the transportation of dead bodies, Dr. Baker pointed out the necessity for such a law, and how important it is that it should be enforced. Fifteen or twenty years ago, he said, not any cases of diphtheria had been traced to dead bodies. It is easy to trace them now. But consumption is, apparently, spread in a similar manner, and the corpse of a consumptive is as dangerous as a diphtheria corpse, only the period of incubation is so long that in following it up it will take very careful work in that special line of investigation to trace its spread.

Very respectfully,

MASON W. GRAY.

NATIONAL CONFERENCE OF STATE BOARDS OF HEALTH.

REPORT OF DELEGATE TO THE MEETING IN CHICAGO, ILLINOIS, JUNE 10, 11, AND 12, 1896, BY HENRY B. BAKER, M. D.

Twenty States were represented, from Michigan, at the north, to Alabama at the south; from Rhode Island at the east, to California, at the west. Illinois was represented by four delegates, Indiana by three, Ohio by two, and North Carolina by two.

At the opening of the Conference the delegates listened to an address of welcome by Hon. John P. Altgeld, Governor of Illinois, which address included an interesting comparison of the rapid progress in sanitary science and practices with the slower progress in legal practices because of the legal measures having to conform to laws which were not easily changed.

Mayor Swift, of Chicago, also briefly welcomed the Conference, saying, "Nothing interests our city more thoroughly or demands her attention more closely then the solving of the sanitary problem. One of the greatest questions which concerns our city is the sanitary question. The great drainage canal is one of the experiments in this direction which will necessitate an expenditure of hundreds of millions of dollars before completion."

Four very interesting local features of this meeting were:

1. A lecture by Lyman E. Cooley, C. E., of the United States Deep Waterways Commission, on the subject of "The Sanitary and Ship Canal of Chicago—Solution of the Sanitary Problem."

2. A tour of inspection of the main channel of the Sanitary District of Chicago, tendered to the Conference by the Board of Trustees of the Sanitary District.

3. An address by Hon. B. A. Eckhart, President of Board of Trustees, Sanitary District of Chicago.

4. A visit to the several intakes of the water-supplies of Chicago.

(1.) Mr. Cooley's lecture was a complete statement [I] of the original conditions and the needs for action to improve the sanitary condition of Chicago, built as it was on low lands, sewered into the river and lake front, from which its water-supply is derived. II. A statement of the Illinois and Michigan Canal, constructed in 1836–48, from Chicago 97.24 miles to the alluvial valley at LaSalle. III. The sanitary history of Chicago in the thirty-four years, 1850–1885, including the inauguration of the sewer system in 1856. IV. Circumstances which led up to the appointment of the "Drainage and Water-Supply Commission" in 1886. The "Sanitary District of Chicago" was constituted by a vote of the people in November, 1889. Engineering operations began in July, 1890. V. "The theory of the sanitary solution is,—a main outlet extending from the waters of Lake Michigan, which is also to be a navigable channel, with at least two branches, one north and one south—all to flow by gravity and to receive the sewer outfalls of the entire district, to have sufficient current to remove the sewage quickly and be adequate in volume to dilute the same beyond offense to the citizens of the district and to the people of the valley, and to be sufficient to control floods and keep urban landwater out of the lake."

(2.) The tour of inspection of the main drainage canal was made by special train over the A. T. & S. F. R. R., two stops being made for inspection of work in progress, before reaching Willow Springs where luncheon was provided, and Mr. Eckhart gave his address, after which the special train was again taken to Lockport where there was a fine view of the cut for several miles through the rock.

(3.) In his address, Mr. Eckhart dealt with the successive efforts of Chicago to dispose of its sewage and to obtain a water supply. "At first water was taken from the lake at a little distance from the shore, then from a much greater distance. Then a project, which for the time seemed most daring: to tunnel under the lake for a distance of two miles. This, at the time, seemed a provision for years to come. But the growth of the city seemed always to outstrip any provisions for sewage or water." The sewage went into the river, which generally had no current and was no better than a cesspool. "At times of freshets the current, then formed, carried the accumulations of weeks out into the lake. Two miles away was not far enough to prevent the water-supply from being contaminated." * *

"Chicago produces 1,500 tons of solids in sewage daily. The difficulty of disposing of the sludge from the daily precipitation of this mass would seem almost insuperable."

In his address Mr. Cooley said:—

"The canal now constructing, follows alongside of the general course of the old canal and to make room, shifts the Desplaines river to a new bed for thirteen miles, and builds a massive embankment against floods down the middle of the valley for twenty miles. Leaving the west fork of the river one-half mile west of the old canal, passes through alluvial and boulder clays for seven miles to the Desplaines valley at Summit; thence through every variety of material of the ancient stream-bed and through muck pools, occasionally in shallow rock-cutting, six miles to Willow Springs; thence through similar formations more difficult if possible and cemented in localities, overlying rock of varying depth for six miles to below Sag valley, and finally, nine miles through continuous rock-cutting, scarcely covered with a turf as though abandoned yesterday in time, the divide is crossed in twenty-eight miles to the site of the controlling works where the flow of the channel will be discharged into the Desplaines river and varied at pleasure. Down the hill for seven miles through the city of Joliet, works must be constructed to direct the escaping waters in their descent of seventy-six feet, and other works must be constructed through the city of Chicago to feed the channel. Altogether, the necessary works extend through forty miles.

"For the fifteen miles in rock-cut below Willow Springs, the channel is 160 feet wide at bottom and two feet wider at top, the sides being carried up in retaining wall where the rock fails to reach the surface. For the thirteen miles in earth between Chicago and Willow Springs, the channel is 202 feet wide at bottom with sides rising one foot vertical to two feet horizontal. For a length of 7.8 miles toward the city, the bottom is given a present width of 110 feet to be enlarged to full dimensions in the future. The grade is fixed at one foot in 20,000 in the rock and one in 40,000 in the earth. The depth is twenty-two feet below standard low water of Lake Michigan, though this may be increased to twenty-four feet by an adequate lake connection.

"The law fixes the capacity of the finished channel at not less than 600,000 cubic feet per minute (at *all times*), but permits the part lying wholly in earth to be enlarged progressively with the growth of population, provided 'it will reduce and maintain at all times a continuous flow of not less than 20,000 cubic feet per minute for each 100,000 of the population' of the district."

In his address Mr. Eckhart said: "Some doubts have been expressed as to whether such a volume of water could be taken through the Chicago river without creating a current in excess of the limits of the law, and thus be dangerous to navigation, but recent extensive investigations by our engineering department have determined that by widening and deepening the river and in some places creating by-passes the requisite amount can be obtained with absolute safety to commerce." * * * "The estimated cost of such improvement of the river is between eight and nine hundred thousand dollars. Of course any improvement of the river by widening and deepening it will be to the advantage of shipping. This work can be taken up and prosecuted during the season of 1896 and 1897 so that we may confidently look to the fall of 1897 as the time when the waters of the lake will be admitted to the channel."

(4.) Accompanied by the Board of Commissioners of Public Works, the members of the Conference of State Boards of Health were escorted, by steamboat, to the several intakes of the water-supplies of Chicago. The visit was at an opportune time to inspect the methods of constructing the "cribs" at the mouths of the tunnels, and especially the tunnels themselves, and at one of the "cribs" the members of the Conference were taken to the bottom of the lake, and out into one of the tunnels which was soon to be put in use for conveying the water from miles out in the lake to the pumping station at the shore. Entering the tunnel, at its "crib" end by way of a shaft down through the water, when one realizes that he is walking under the lake many feet below its surface, the sensation is a new one.

No one can thoroughly examine the present conditions of water-supply and sewerage at Chicago without becoming convinced that some such work as the "Main Drainage System" is essential to the welfare of the people of Chicago.

After an address by the President of the Conference,—J. N. Taylor, M. D., of Indiana, G. T. Swarts, M. D., Secretary of the Rhode Island State Board of Health, made a report on Vaccine Farms, which was discussed at length, the discussion including views of members as to preference of bovine or humanized virus, each sort having advocates.

On motion of the Secretary of the Michigan State Board of Health, a committee of which Dr. Hewitt, the Secretary of the Minnesota Board was to be chairman, was appointed, to draft resolutions endorsing vaccination. Later, this committee reported a proposed resolution as follows:—

Resolved, That on this, the anniversary of the centennial year of the discovery of vaccination by Jenner, this association gladly commemorates that event by the formal and deliberate statement of its absolute confidence in vaccination with typical humanized or animal lymph as the only known preventive of small-pox, without which that disease would again attain the proportions of a terrible plague.

(Signed) { CHARLES N. HEWITT,
L. P. LACHAPELLE,
HENRY B. BAKER.

On motion of Dr. Lindsley the resolution was adopted.

An interesting and instructive feature of this meeting of the Conference was the usual responses of the delegates from the several States to the question—

"*What substantial progress is being made in Sanitary work in the several States and Provinces?*"

From these reports, it was plain that the work is not along the same lines in any two States, and that if the work of any one State Board were to be so extended as to cover that now being done in the several States, it would indeed be extensive. But the reports were valuable not only for guidance in enlarging the scope of the work in some of the States, but also in suggestions for improvements in methods of work now being done. Also the reports were very encouraging in results of work already done.

The next questions discussed were:—

a. "*Is it not possible to have uniformity of laws and rules for the transportation of corpses?*"

b. "*Does not sanitary science provide sufficient knowledge and skill to transport a corpse dead of any disease in such manner as to be safe to the public?*"

Dr. Hewitt, Secretary of the Minnesota State Board, led the discussion, and was of the opinion that both questions should be answered in the affirmative.

Dr. Lee, Secretary of the Pennsylvania State Board, related instances of the spread of diphtheria by a corpse which had not been disinfected.

Dr. Scott, Secretary of the Illinois State Board, called attention to the difficulty of knowing whether or not a corpse had been properly prepared by scientific disinfection. "I would be willing to take a certificate that Dr. Reilly would issue, and take a corpse anywhere. But I would not be willing to take a body on a certificate from some fellow down at a little cross-roads where nobody knows whether or not a body is properly prepared for shipment in safety."

Dr. Reilly, Assistant Commissioner of Health of Chicago, emphasized the importance of the examination and licensing of undertakers. "In the last ten months we have made a radical reform in the undertaker's practice and conduct of funerals of persons who have died of contagious diseases. I should not hesitate to take a body of a person who had died of a contagious disease, as now prepared by a certain class of our undertakers, and put it in my room and sleep with it, any more than if the person had died from the result of a broken leg." "We have an undertakers' examining board, appointed by the health department. * * * Undertakers who pass the examination of this board—which embraces a practical demonstration upon the cadaver, and examinations in anatomy, disinfection, hygiene, etc.—are exempt from the supervision of the department in their conduct of contagious-disease burials. All others are supervised by a medical inspector."

Other phases of the subject were discussed by many delegates. A committee was appointed to prepare a report on the two questions submitted, and also on the question of holding public funerals of persons dead of contagious diseases. The committee is Drs. Scott, of Illinois; Hewitt, of Minnesota; and Lee, of Pennsylvania.

Dr. Scott, of Illinois, read a paper on "What shall be done with immigrants who arrive on vessels infected with small-pox?"

The paper was discussed by several. Dr. Hewitt, of Minnesota, said, "Our experience has been that infection is brought in clothing ninety-nine times to one by the person." "The nearest to an epidemic we ever had, came in an old garment. A woman put on her good clothes when she came out, and when she reached Minnesota she put on her old clothes to nurse her baby, and the result was that we had 300 cases and 100 deaths."

A committee was appointed to formulate the views of the Conference,—Drs. Swarts, of Rhode Island; Probst, of Ohio, and LaChapelle, of Montreal.

The next question for consideration was, "How to obtain the vital statistics of a State," proposed by the State Boards of Health of Maryland and New York, the discussion to be opened by Dr. Henry B. Baker, of Michigan.

A written paper on this subject had been prepared, illustrated by a diagram, copies of laws, and numerous blank forms. Omitting most of the blank forms, etc., the paper was as follows:—

HOW TO OBTAIN THE VITAL STATISTICS OF A STATE.

SUGGESTIONS, IN OPENING A DISCUSSION.

BY HENRY B BAKER, M. D., SECRETARY OF THE MICHIGAN STATE BOARD OF HEALTH, LANSING.

*I. Statistics of Deaths.**

1. The State must start out with the idea that all labor and expense connected with registration shall be adequately remunerated. The State cannot, more than the individual, expect to get something for nothing. The local registrars, the physicians who certify to the causes of death, every person who contributes to the accuracy or completeness of registration returns, is entitled to suitable pay for so doing.

2. The State should be divided into registration districts sufficiently small that the local registrar can keep the work up to a good standard. Any failure to register the data prescribed by law should receive his immediate attention. The township, city and village organizations are the proper local jurisdictions.

3. The local registrar should be a man especially fitted for his position, and possessing (1) good clerical ability, including neatness and accuracy; (2) some knowledge of the uses and importance of the facts registered, including a competent discrimination in the employment of terms designating causes of death. These qualities will be most frequently found in trained health-office employés, or experienced city or township clerks. They are not always found in officers chosen chiefly for political reasons, and whose functions include many important duties very diverse from registration, as is the case with the supervisors and assessors who take the annual enumeration of deaths in Michigan. Lengthened tenure of office of competent registrars is an essential condition of a good registration system. So far as it is practicable, I think the mortality statistics should be in the hands of medical officers.

4. The local registrars should report directly to the State Registration Bureau. The county system is a failure for births and deaths. Reports should be made weekly or at least monthly. The central office should exercise a rigid inspection over the workings of the local stations, and should have power to displace incompetent or negligent officials. The central office should be under competent medical and statistical direction, and should endeavor to raise the character of the service by direct correspondence with local registrars and physicians in case of defective returns.

I regard it as of more importance that the officer in charge of the central office shall be a competent medical statistician than that the law for the collection of the data shall be perfect. Because, from actual observation, I am convinced that with a good law, a non-expert controlling the collection, tabulation, collaboration and publication of the statistics, will yield results of no reliability or value; while with a very imperfect law, an expert medical statistician will be able to elaborate data of great value. In proof of this last I may instance the conditions in Michigan, where the law is very imperfect, yet Dr. Wilbur, the efficient chief of the Bureau of Vital Statistics, is able to prepare for publication by the State Department, statistics of much value, and which are much used by the State Board of Health.

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*Under this first sub-head I acknowledge my indebtedness for aid to C. L. Wilbur, M. D., Chief of Bureau of Vital Statistics, State Dept., Lansing, Mich.

5. Returns of deaths must be based upon burial certificates, issued under a law that prohibits burial or other permanent disposition of any corpse until a permit has been issued by the local registrar. The local registrar, or in his default the State Bureau, should have power and should be required to rigidly enforce this law. Undertakers should be registered, and compelled to observe the law.

6. The pay of the local registrars may depend in part upon the number of deaths accurately registered, except that (1) in very sparsely settled localities a higher fee should be allowed by the State at large; and (2) in cities the salary of the health officer or clerk may cover the expense. No fees should be charged any person registering a death, it would be better that a fee should be paid. Fees for searches may properly be allowed as perquisites of the registrars.

7. The health service of the State, the press, the medical profession, and the Registration Bureau can do much to popularize the work by showing its usefulness, and in this way lead to a general acceptance of registration as an ordinary condition of life, as inevitable as death and taxes.

II.—Notification, and Statistics of Dangerous Communicable Diseases.

The most important uses of Vital Statistics are for purposes of public-health work: for the study of the causation, modes of spreading, best means for the restriction of diseases, etc., or for purposes of immediate action tending toward the restriction of disease. For some of these purposes, mortality statistics are sufficient, or at least useful; but for immediate action for the restriction of disease they are not sufficient nor very useful, the knowledge they supply comes too late.

Wherever public-health work is properly undertaken, there is compulsory notification of sickness from the dangerous communicable diseases.

Herewith is submitted a law under which immediate notification of such diseases is required in Michigan.[*] One section of the law provides nominal compensation to physicians for the enforced reports; but, in practice, this is seldom called for. The diseases required to be reported are "small-pox, cholera, diphtheria, scarlet fever, or any other disease dangerous to the public health." The "other diseases," etc., have been interpreted by the State Board of Health to be "measles, rötheln (because scarlet fever is so often mistaken for rötheln), whooping-cough, typhus fever, typhoid fever, puerperal fever, erysipelas, and consumption." Other diseases may be added hereafter. The blank form used is submitted herewith (p. —). A blank form used in Germany is submitted (p. —).

Wherever there is a State Board of Health, or State supervision of public-health interests, notice of outbreak of every dangerous disease should be supplied to such central office. Herewith I submit the blank form [L] used for this purpose by local health officers in Michigan.[†]

Such "outbreak reports" enable the Secretary of the State Board of Health, or other State official, to have knowledge of the first occurrence of each such disease in every locality. He can then take such action as is practicable by advice or otherwise, to aid the locality in restricting the disease. In Michigan action is always taken.

In order that the central office shall constantly have knowledge of the presence or absence of each such disease, the "outbreak report" must be supplemented by "weekly reports" on blank [M] so long as the disease continues. [‡]

In order to compile useful *communicable-disease statistics* the central office must receive from each locality in which such a disease has occurred, a "Final report," after the outbreak is over. Herewith is submitted the several blank forms used for this purpose in Michigan. One blank [K][§] is used for the final report of scarlet fever, diphtheria, measles, and whooping-cough. One [R][¶] for consumption, and another [O][‖] for typhoid fever, [Q][**] for small-pox.

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[*] Sections 1675 and 1676 Howell's Statutes. A similar law has been on the statute book since 1845 and, I believe, since the organization of the State in 1837; but it has been enforced only since the establishment of the State Board of Health in 1873.

[†] The outbreak report blank [L] is an improved form of the blank printed on page 253 of the annual report of this Board for 1884.

[‡] The weekly report blank [M] is an improved form of the blank printed on page 253 of the annual report of this Board for 1884.

[§] A copy of blank [K] is printed in the annual report of this Board 1888, pages xiii-xiv. Since that time the blank has been considerably improved.

[¶] The final report blank [R] relative to consumption, is printed on pages lxiv-lxv of this Annual Report.

[‖] The final report blank [O] relative to typhoid fever, is printed on pages lii-liii of this Annual Report.

[**] The final report blank [Q] relative to small-pox, is printed on pages lxii-lxiv of this volume.

Of all "vital statistics" thus far collected, probably those of most immediate practical utility are those which relate to the dangerous communicable diseases. Because from such statistics we may learn the modes of spreading, results of different measures for their restriction, the ages of persons most in danger of contracting, and of dying from each disease, and many other facts of immediate usefulness to those who are planning to restrict such diseases. Herewith is submitted pamphlet publications containing communicable-disease statistics in Michigan. [Reprints 431, 432, 433, etc., or more recent ones if possible.] One of the most instructive results of such vital statistics in Michigan, is the diagram (Plate No. 516) exhibiting facts relative to scarlet fever and diphtheria.

It may thus be seen that notification of the dangerous communicable diseases has two important functions: (1) to make it possible for local and State boards of health to act promptly for the restriction of each such disease; (2) to supply the starting point for the collection of an important branch of the vital statistics,—communicable-disease statistics, which are especially important, because the communicable diseases may be restricted.

Speaking on this subject in Great Britain, Dr. Arthur Newsholme, in a paper before the Royal Statistical Society, London, Dec. 17, 1895, said: "We are, by the means of notification, gradually accumulating throughout the country a mass of information as to the seasonal, annual, epidemic, and cyclical prevalence of the chief infectious diseases such as has never previously been possessed by epidemiologists. As the first condition of success in the prevention of disease is knowledge of its natural history—its epidemicity, its relation to age and sex, to social and industrial conditions, to the complex meteorological conditions embodied in the words 'season and climate'—such an accumulation of information must ere long bear fruit of practical, useful character."* * * * "It is only by the accumulation of accurate and complete information as to each epidemic and inter-epidemic period, and by the collateral study of the personal and environmental conditions associated with these periods, that we can hope to arrive at a less empirical and more rational conception of the causation of each infectious disease, and through that of its prevention." Evidently the possession by each medical officer of health of information as to the amount and nature of the infectious diseases prevalent in his own district does not exhaust the possibilities of utility of these returns. Their value would be greatly increased by collateral information as to the amount and nature of the infectious diseases prevalent in neighboring districts and in the rest of the country, or even in other countries. By such an interchange of prompt and trustworthy information it would be practicable to forecast the possibilities of the introduction into a community of a given disease, and take suitable precautions."*

In England such interchange of notifications was first undertaken for thirty-three towns, by Dr. Tatham of Salford, in 1888; and, for all towns in which notification was compulsory, by the Local Government Board, in 1889. It has been in operation in Michigan since October, 1881. It is each year becoming more complete. Herewith is submitted a copy of such a recent bulletin, the second page of which supplies, each week, knowledge of every township, city, and village in Michigan in which each dangerous communicable disease is reported present.

III.—Sickness Statistics.

The ideal vital statistics have not yet been generally undertaken by States, in this country or abroad; but any attempt to answer the question put to me—"How to obtain the vital statistics of a State?" would be exceedingly incomplete if it did not recognize the fact that the leaders in vital statistics have, for many years, considered that the mortality statistics are nothing more than the entering wedge which should lead to the collection of vital statistics of much greater usefulness to the people. Mortality statistics should be supplemented by sickness statistics Quoting from Dr. Newsholme's paper,* "From the standpoint of the Commonwealth and the common health, sickness is more important than death; for 'it is the amount and duration of sickness rather than the mortality that tell on the prosperity of a community.' (Dr. Dickson.) Or as Charles Dickens has stated it: 'It concerns a man more to know the risk of the fifty illnesses that may throw him on his back, than the possible date of the one death that must come. We must have a list of the killed *and of the wounded too.*'†" The veteran statistician, Dr. Farr, the foremost vital statistician in the world, in the Thirty-fifth Annual Report of the Registrar General of England, wrote: "The thing to aim at ultimately is a return of the cases of sickness in the civil population as complete as is now procured from the army in England. It will be an invaluable contribution to therapeutics, as well as to hygiene; for it will enable the therapeutists to determine the duration and the fatality of all forms of disease, under the several existing systems of treatment, in the various sanitary and social conditions of the people. Illusion will be dispelled, quackery, as completely as astrology, suppressed, a science of therapeutics created, suffering diminished, life shielded from many dangers. The national returns of cases and of causes of death will be an arsenal which the genius of English healers cannot fail to turn to account."*

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* Arthur Newsholme, M. D., Jour. Royal Statistical Society, Mar., 1896.
† "All the year round", Vol. 4, pp. 227-8.

On account of the very great expense in time used by the individual physicians, and in money to be expended by the government that undertakes to compile reports from all physicians made weekly or even monthly, it will probably be a very long time before any State government undertakes to collect and compile weekly or monthly reports of all sickness. We may consider Michigan an average State, in which there are about four thousand physicians. Four thousand postage stamps or postal cards each week or month would be required for reports. The useful compilation of these reports would require constantly several clerks, and an expert statistician to supervise the work.

In the published transactions of this Conference, for the meeting four years ago, in Lansing, there is a report by me on vital statistics, relating mainly to sickness statistics,† in which I pointed out the fact that for most uses for which such statistics are needed for *public-health* purposes there is no need whatever of reports of all sickness; weekly reports by one hundred physicians in active, general practice in different parts of the State, are sufficient to give us knowledge approximating sufficiently near the exact truth to enable us to study the months and weeks of most and of least sickness from each disease of any considerable importance as a cause of sickness.

The collection of the weekly reports from about one hundred observers, and the careful compilation of the reports, employs one clerk all of the time, and another clerk part of the time. My belief is that few States will at present be willing to invest in sickness statistics much more than this, and that, at present, there is no hope of having reports of all sickness, especially as they are not needed for studying the causation, restriction, or prevention of disease, although they might be useful, as Dr. Farr says, for increasing our knowledge in therapeutics.

In *addition* to the reports from a sufficient number of representative physicians in active, general practice, it may be well for our States to copy after methods employed in Germany, and which Dr. Newsholme has said "come nearer than any hitherto described to a national system of registration of disease," namely, compulsory weekly or monthly reports of all patients admitted by public and private hospitals.

It cannot be admitted, however, that reports from hospitals alone can supply accurate knowledge of the sickness about a State, at least not in this country. And, from the experience in Michigan, it is certain now that reports by representative physicians in active, general practice do supply sufficiently-accurate knowledge of the sickness in a State. Such sickness statistics have been collected and compiled in Michigan since 1876. The system was first started by Benj. W. Richardson, M. D., in England in 1852, the tabulation being in the "Journal of Public Health and Sanitary Review" of 1855, and the registration was continued by Dr. Richardson for several years.‡

> "In addition to the general notification of infectious diseases in Germany, admirable hospital statistics are kept in most German towns, and particularly in those of Prussia, which come nearer than any hitherto described to a national system of registration of disease.§ These hospital statistics have been kept since the year 1877: Professor Guttstadt, to whose kindness I am much indebted for valuable information, being responsible to the Königl. Stat. Bureau for their reception, tabulation, and publication. They are published on a uniform basis for all the great Prussian towns, and they relate for each town to general diseases (including infectious diseases), diseases of the eye, parturition, lunacy, idiocy, and old age. Both State and private hospitals are included in the reports. From the annual reports issued from the office of the Königl. Stat. Bureau in Berlin we can learn the total proportion of hospital cases in each State and town, and the proportion shared by different groups of diseases * * * These statistics will, as years go on, be invaluable for demographical investigations. Already they possess a very high value to the communities to which they relate. They constitute a mine of information for epidemiological and general medical purposes."¶

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* Paper by Arthur Newsholme, M. D., Jour. Royal Statistical Soc., Mar., 1896, p. 8.

† The report was also reprinted from the Report of the Michigan State Board of Health, 1892; "Reprint No. 414."

‡ Paper by Arthur Newsholme, M. D., Journal of the Royal Statistical Society, London, England, March, 1896, p. 4, Vol. LIX.

§ I could not agree to this statement, because hospital statistics cannot be accepted as representative of all sickness among all classes of people. The Michigan sickness statistics are very much more valuable as a model for a "national system of registration of disease"—*Henry B. Baker.*

¶ Arthur Newsholme, M. D., Journal of the Royal Statistical Society, London, England, March, 1896, pages 16–17, Vol. LIX.

*Weekly return of cases of infectious and constitutional diseases in State and Private Hospitals in Germany.**

"The following is the (anglicized) return which has to be made weekly by the resident medical officer of each hospital. The return is compulsory, and no fee is paid for this or any other notification in Germany.

"*Number of Cases admitted and now in the Hospital.*

In
for the month , 189 ,
in the week from to 189 .

1. Number.	2. Name of Disease.	3. Number of Patients Admitted.	4. Remarks
1	Small-pox		
2	Varicella		
3	Measles		
4	Scarlet fever		
5	Diphtheria		
6	Croup		
7	Whooping-cough		
8	Enteric fever		
9	Relapsing fever		
10	Typhus fever		
11	Epidemic cerebro spinal meningitis		
12	Dysentery		
13	Cholera nostras		
14	Cholera		
15	Puerperal fever		
16	Intermittent fever		
17	Erysipelas		
18	Syphilis, including gonorrhœa		
19	Trichinosis		
20	Pneumonia and pleurisy		
21	Acute bronchial catarrh		
22	Pulmonary phthisis		
23	Other diseases of the respiratory organs		
24	Acute intestinal catarrh		
25	Cerebral apoplexy		
26	Delirium tremens and chronic alcoholism		
27	Acute rheumatism		
28	Other rheumatic affections		
29	Injuries		
30	All other illnesses		

....

Signature.

"*Norway.*—There is a system of immediate compulsory notification of certain diseases, and a monthly notification of certain other diseases.

July, 1895, the diseases required to be notified daily (which may be varied from time to time) included, I was informed by Dr. Bentzen, the health officer, small-pox, measles, scarlet fever, typhus fever, enteric fever, erysipelas, diphtheria, puerperal fever, and cholera. Weekly returns of these cases are tabulated, along with particulars of the mortality in Christiania, in a weekly bulletin issued by Dr. Bentzen. Cases of influenza have been required to be notified weekly. The following is the form (anglicised) for the monthly list of cases in each doctor's practice :— †

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* This blank form is copied from a paper by Arthur Newsholme, M. D., in Journal of the Royal Statistical Society, London, England, March, 1896, p. 20. Vol. LIX

† Arthur Newsholme, M. D., Journal of the Royal Statistical Society, London, England, March, 1896, p. 19, Vol. LIX.

*Monthly return of New Cases of Epidemic Diseases observed in Christiania, Norway.**

From to 189 .

Disease.	Total number of cases.	Fatal cases.	Of those Treated there were				Remarks.
			Under 15 years.		Over 15 years.		
			Male.	Female.	Male.	Female.	
Typhus fever							
Enteric fever							
Epidemic cerebro-spinal meningitis							
Puerperal fever							
Small-pox							
Chicken-pox							
Scarlet fever							
Measles							
Erysipelas							
Septicæmia, pyæmia							
Whooping-cough							
Diphtheria							
Angina membranacea (croup)							
Mumps							
Bronchitis							
Catarrhal pneumonia							
Catarrhal and follicular tonsillitis							
Croupous pneumonia							
Pleurisy							
Rheumatic fever							
Ague							
Acute diarrhea and cholera nostras							
Dysentery							
Scorbutus							
Non-infecting chancre							
Acquired syphilis							
Hereditary syphilis							
Gonorrhœa, urethitis							
Scabies							
Tapeworm							
Total							

This form must be filled up and sent to the office of the Sundhedskommission (Board of Health) before the third day of the month.

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*This blank form is copied from a paper by Arthur Newsholme, M. D., in Journal of the Royal Statistical Society, London, England, March, 1896, p. 20, Vol. LIX.

The following is a weekly schedule, showing presence of contagious disease and which must be filled out and sent to the Imperial Health Office by doctors in different parts of Germany.*

Form "A."

In the week from .... to .... 189....
Day
I have taken for treatment the following cases of contagious diseases which have been sent to the hospital:

Name.	Occupation.	Age.	Residence.	Date of sickness.	Disease.	Remarks.

(Date) .... *189....*

.... *M. D.*

Postal blank for weekly reports to the Michigan State Board of Health, of diseases under the observation of representative physicians in active, general practice.

Diseases in .... and vicinity.
☞PLEASE DATE.☜
week ending Sat., ..., *189....*

REMARKS:—

....

Ed. 40.

a. Please mark the disease of which there is the greatest number of cases, 1; the disease having next greatest number of cases, 2; the next, 3; and so on for each disease, writing the same figures opposite diseases having the same number of cases. Write 0 opposite each disease of which there is no case under your observation. [For full statement of plan, see second, third, and fourth pages of record-book cover.] A blank indicates that the item has been overlooked.

If this report includes a contagious disease, please mention, on the bottom or margin of this card, the township, city, or village in which the disease is.

Please mail this, ☞signed and dated,☜ as soon as convenient after close of week specified.

DISEASES, CASES OBSERVED.

	Preval'nce Order. See a	No. of Cases.
Brain, Inflammation of		
Bowels, Inflammation of		
Bronchitis		
Cerebro-spinal Meningitis		
Cholera Infantum		
Cholera Morbus		
Consumption, Pulmonary		
Croup, Membranous		
Diphtheria		
Diarrhea		
Dysentery		
Erysipelas		
Fever, Intermittent		
Fever, Remittent		
Fever, Typhoid (Enteric)		
Fever, Typho-malarial		
Influenza		
Kidney, Inflammation of		
Measles		
Neuralgia		
Pleuritis		
Pneumonia		
Puerperal Fever		
Rheumatism		
Scarlatina		
Small-pox		
Tonsillitis		
Whooping-cough		

.... *M. D*

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* The form is anglicized from the German, on page 15, Jour. Royal Statistical Soc., London, England. Mar., 1896, in a paper by Arthur Newsholme. M. D.

Herewith are submitted blank forms used in Christiania, Norway, for monthly reports of important diseases by all physicians, in Germany for monthly reports from public and private hospitals, and in Michigan for weekly reports by representative physicians in active general practice.

Sickness statistics were collected by the Massachusetts State Board of Health for more than a year, those for the year 1875 having been published in the Seventh Annual Report of that Board, Jan., 1876. The system in Michigan is similar to that in Massachusetts, but is made scientifically exact by limiting each report to cases actually under the observation of the reporter.

The closing sentences of the report on the subject in Massachusetts are as follows: "In the words of a distinguished leader in sanitary reform,* 'registration of deaths represents the wrecks which strew the shore, while that of sickness would tell us of the coming storms, and enable us to trim our vessels to meet them. Till we have such a system of disease-registration, public health cannot be administered with full intelligence.'*†"

I trust that I have clearly pointed out just how "such a system of disease registration" as Hon. Lyon Playfair thought essential, can now be economically established and maintained by any State government, as has been demonstrated by the Michigan State Board of Health.

NOTE.—As delegate to this meeting of the National Conference of State Boards of Health, in Chicago, Ill., June 10-14, 1896, I have endeavored to include in this report the items of most interest to this Board and to the people of Michigan. However, there were so many items of interest in the meeting that any person wishing a complete report can refer to the proceedings of the Conference which have been published.

REPORT OF THE SECRETARY RELATIVE TO PROPERTY, ETC., FOR THE FISCAL YEAR ENDING JUNE 30, 1896.

To the President and Members of the Michigan State Board of Health.

GENTLEMEN:—In compliance with Section 5 of Article II of the by-laws of this Board, the following report of the "Nature and amount of property belonging to the Board, which has been received, issued, expended, and destroyed since the last report, and of the property remaining on hand, and also in whose care each item of property is intrusted," is respectfully submitted:

Preceding reports should enable one to learn the items of property on hand at the beginning of the fiscal year 1896. My last report is printed on pages cxxxvii-cxlix of the Annual Report for 1895. Since last report, instruments and articles of a similar nature have been purchased as follows:

PHOTO-ENGRAVED‡ PLATES PURCHASED.

One plate—Deaths in Michigan, 10 years, 1884-93, Consumption, Diphtheria, Pneumonia, Typhoid fever, Scarlet fever, Measles, Whooping-cough, and Small-pox.

One plate—Death-rates in Mich. per 100,000 population, Consumption, Scarlet fever, Pneumonia, Cancer, Measles, etc.

One plate—Deaths in Mich., 10 years, 1884-93, Consumption, Pneumonia, Diphtheria, Typhoid fever, etc.

Two (stereotype) plates—Deaths in Mich., 10 years, 1884-93, Consumption, Pneumonia, Diphtheria, Typhoid fever, etc.

Fifteen plates relating to the Meteorological conditions in Michigan in 1893.

Five plates relating to Weekly Reports of Sickness in Michigan in 1893.

One plate—Movements of Contagium of Diphtheria in 1893.

One plate—Reported Deaths from Diphtheria in Mich., 26 years, 1868-93.

One plate—Diagram of H. M. Loud's Lumber Camp, No. 8, Miller township, Alcona Co., Mich.

One plate—Isolation and Disinfection restricted Diphtheria in 1893.

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* Right Hon. Lyon Playfair, F. R. S., Address on Sanitary Reform, 1874

† Seventh Annual Report Mass., State Bd. Health, Jan., 1876, p. 492.

§ In a few specified instances these plates are not photo-engraved.

One plate—Reported deaths from Diphtheria in Mich., 26 years, 1868-93.

One plate—Movements of Contagium of Scarlet fever in 1893.

One plate—Exhibiting what per cent of all deaths from Scarlet fever were of persons within certain periods of age during 2 years, 1892-93.

One plate—Isolation and Disinfection restricted Scarlet fever in Mich. in 1893.

One plate—Distribution of Diphtheria reported in Mich. in 1893.

One plate—Exhibiting what per cent of all Deaths from Diphtheria were of persons within certain periods of age.

One plate—Distribution of Scarlet fever reported in Mich. in 1893.

One plate—Outbreak of Typhoid fever in Otisco Tp., Ionia Co., Mich.

One plate—Movements of Contagium of Measles in 1893.

One plate—Low Water in Wells and Sickness from Typhoid Fever in Mich., 15 years, 1878 and 1880-93.

One plate—Isolation and Disinfection restricted Typhoid fever in Mich. in 1893.

One plate—Outbreak of Typhoid fever in Sylvan Center, Washtenaw Co., Mich.

One plate—Exhibiting what per cent of all Deaths from Measles were of persons within certain periods of age, 2 years, 1892-93.

One plate—Isolation and Disinfection Restrict Measles in 1893.

One plate—Distribution of Typhoid fever in Mich. in 1893.

One plate—Distribution of Measles in Mich. in 1893.

One plate—Movements of Contagium of Typhoid fever in Mich. in 1893.

One plate—Exhibiting by age groups the Average proportionate numbers of Deaths in Mich. from Typhoid fever in the 2 years, 1892-93, per 10,000 persons living in June 1894, according to the State Census.

Three (embossed) plates, for letter heads, Mich. State Board of Health.

One plate—Alleged Nuisance in Vassar Village, Tuscola Co., Mich.

One plate—Site of Alleged Nuisance in Mackinaw City Village, Cheboygan Co., Mich.

One plate—Reported Deaths from Measles in Mich., 25 years, 1868-92, per 100,000 persons living during each of the 25 years, etc.

One plate—Relation of Influenza, Tonsillitis, and Rheumatism.

One plate—Relation of Influenza, Bronchitis, Pneumonia, Neuralgia and Pleuritis.

One plate—Relation of the Atmospheric Temperature to Sickness from Influenza and Pneumonia in Mich.

One plate—Relation of Wind to Influenza in Mich.

One plate—Relation of Humidity to Influenza.

One plate—Atmospheric Temperature and Influenza.

Fifteen plates—Relating to the Meteorological Conditions in Michigan in 1894.

PROPERTY LOANED.

Many photo-engraved plates were loaned to Robert Smith and Co., State Printers and Binders, Lansing, to be used in printing Annual Reports and other publications of this Board. Most of these plates have been returned, but a few still remain charged to them on the property loan book of this Office. The plates will probably be returned as soon as the State Printer is through with them.

INSTRUMENTS PURCHASED SINCE LAST REPORT.

One raingauge with tube to catch overflow.

One Anemometer.

METEOROLOGICAL INSTRUMENTS ISSUED.

One minimum registering thermometer (to replace one accidentally broken while in use) to C. E. Beers, Adrian.

Two maximum registering thermometers (to replace the ones accidentally broken while in use) to Dr. W. C. Gates, Rockland.

One galvanized iron raingauge, with tube to catch overflow, (to replace one disabled by long use) to D. W. Mitchell, M. D., Harrisville.

One barometer, and box for protection, one dry-bulb thermometer, one wet-bulb thermometer, boards, clips, cup and wick, one maximum and one minimum registering thermometers, with boards, etc., for hanging. One galvanized iron raingauge, with measuring stick, were sent to E. S. Pettyjohn, Alma Sanitarium, Alma, Michigan.

METEOROLOGICAL INSTRUMENTS RETURNED.

One barometer, and box for protection, one dry-bulb thermometer, one wet-bulb thermometer, board, clips, cup, and wick, one maximum and one minimum registering thermometers, with board, etc., for hanging, and one raingauge, by J. M. Conant, M. D., Tawas City, Mich.

One maximum and one minimum registering thermometers, with board, etc., for hanging, by James D. Munson, Traverse City, Mich.

One barometer, one dry-bulb thermometer, one wet-bulb thermometer, board, clips, cup, and wick, one maximum and one minimum registering thermometers, with board, etc., for hanging, one maximum thermometer, without supports, by Prof. J. W. Ewing, Alma, Mich.

One maximum thermometer by the observer at Rockland.

METEOROLOGICAL INSTRUMENTS ACCIDENTALLY BROKEN WHILE IN USE BY OBSERVERS.

One dry-bulb thermometer, one raingauge ruined by frost, one maximum thermometer, by the observer at Alma.

One maximum thermometer broken by Express Co. in transit to Alma.

One raingauge, with tube to catch overflow, disabled by frost and long use, at Harrisville.

One minimum and two maximum thermometers by the observer at Albion.

One minimum and two maximum thermometers by the observer at Rockland.

METEOROLOGICAL INSTRUMENTS AND OTHER PROPERTY ON HAND.

3 standard barometers (including one in use at this Office).
11 dry-bulb thermometers (including one in use at this Office).
7 wet-bulb thermometers (including one in use at this Office).
6 minimum self-registering thermometers (including one in use at this Office).
5 maximum self-registering thermometers (including one in use at this Office).
1 standard thermometer.
1 standard thermometer for inspecting oils.
6 registering thermometer boards (including one in use at this Office).
9 psychrometer boards (including one in use at this Office).
3 psychrometer cups (including one in use at this Office).
9 minimum thermometer clips.
5 wet bulb clips.
6 screw bolts for registering thermometers.
7 pins for registering thermometers.
2 hooks for hanging barometer.
2 barometer boxes (including one in use at this Office).
2 raingauges (including one in use at this Office).
1 basin for raingauge.
2 caps for overflow tubes.
2 large, galvanized iron pails to measure snowfall.
1 Draper's self-registering thermometer.
1 new anemometer, in use at this Office.
1 old anemometer, disabled by long use.
2 circular magnifying hand glasses.
3 minimum thermometers and 2 maximum thermometers, spoiled by exposure and long use.
3 psychrometer cups, spoiled by rust and long use.
8 psychrometer cups, injured by use; can be repaired.
28 broken thermometers (includes all, since observations have been taken).
1 worn-out anemometer spindle.
207 sheets ozone test-paper.

ACCESSIONS TO THE LIBRARY.

Books and other publications have been received and placed in the library of the Board, during the fiscal year ending June 30, 1896, as follows:—

By Gift, Exchange, etc. (Names and addresses of donors are printed in italics).

Abbott, Dr. S. W., Sec., Boston, Mass.:
Annual Report of the Massachusetts State Board of Health, year 1894.

American Sanitas Company, New York city:
How to Disinfect—" Sanitas."

Baker, Dr. Henry B., Sec., Lansing, Mich :
Causation of Influenza and allied Diseases, with suggestions for their prevention. [Reprint No. 460.]
Diphtheria in Michigan, 1893. [Reprint No. 447.]
Scarlet Fever in Michigan. [Reprint No. 448.]
Typhoid Fever in Michigan. [Reprint No. 449.]
Communicable Diseases in Michigan, year 1893. [Reprint No. 446]
Hydrophobia in Michigan in 1893.
The Time of Greatest Prevalence of Each Disease in Michigan in 1893.
Consumption in Michigan in 1893.
Whooping-cough in Michigan in 1893.
Small-pox in Michigan in 1893.
Tyrotoxicon sickness in Michigan in 1893.
The Time of the Greatest Prevalence of Each Disease. [Reprint No. 444.]
Report of the Michigan State Board of Health, year, 1893.
Alleged Nuisances in Michigan in 1892. [Reprint No. 442.]
Measles in Michigan in 1892. [Reprint No. 440.]
Injuries and Loss of Life and Property alleged to have been caused by the use of Kerosene in Michigan, year 1892. [Reprint No. 441.]
Past and Present Movements for Sanitary Progress in Michigan. [Reprint No. 443.]
Communicable Diseases in Michigan in 1892. [Reprint No. 431.]
Scarlet Fever in Michigan in 1892. [Reprint No. 438.]
Diphtheria in Michigan in 1892. [Reprint No. 432.]
Typhoid Fever in Michigan in 1892. [Reprint No. 439.]
The Time of Greatest Prevalence of Each Disease in Michigan in 1892. [Reprint No. 430.]
Diphtheria in Michigan in 1892. [Reprint No. 432.]
Summary of Vital Statistics of the New England States, year 1892.
Proceedings of the Charlotte Sanitary Convention, Nov. 22 and 23, 1894. [Reprint No. 428.]

Bardell, Willis A., Librarian, Brooklyn, N. Y.:
The 38th Annual Report of the Board of Directors of Brooklyn, (N. Y.) Library, March, 1896.

Barwick, James A., Sacramento, California:
Weather, Conditions of the Crops of 1894.

Berner, Dr. H. Health Officer, Christiania, Norway:
Report of the Bureau of Health of the City of Christiania, Norway, year 1894.

Billings, Dr. John S., Expert Special Agent, Washington, D. C.:
Social Statistics of Cities.—Reprint from 11th United States Census, year 1890.

Bliss, Richard, Librarian, Newport, R. I.:
165th Annual Report of the Directors of the Redwood Library and Athenæum, Newport, R. I., year 1895.

Board of Health, Colorado Springs, Colorado:
Annual Report of the Board of Health of Colorado Springs, year 1895.

Board of Health of Everett, Massachusetts:
Report of the Board of Health of Everett, Massachusetts, year 1893.
Report of the Board of Health of Everett, Massachusetts, year 1894.

Board of Health of Manchester, New Hampshire:
Annual Report of the Board of Health of Manchester, New Hampshire, 1893.

Board of Health of Nashville, Tenn.:
12th Annual Report of the Health Office of Nashville, Tenn., year 1894.

Board of Health of Rochester, N. Y.:
4th Annual Report, Board of Health of the city of Rochester, year ending March 31, 1895.

Board of Health of Winona, Minn.:
Annual Report of the Board of Health of the city of Winona, Minnesota, year ending March 31, 1895.

Bockh, R , Director of Bureau of Statistics, Berlin, Germany:
Statistisches Jahrbuch der Stadt Berlin, year 1893.

Boobbyer, Philip M. B., Nottingham, England:
Annual Report of Medical Officer of Health, Borough of Nottingham, England, year 1894.

Braymer, Dr. O. W., A. M., Camden, New Jersey:
Sanitary Inspection of Factories.

Brigham, Edwin W., Librarian, Boston, Mass.:
Transactions of the Medical Society of Massachusetts, Vol. XVI, No III, year 1895.

Bryce, Dr. P. H., Sec., Toronto, Canada:
Consolidated Public Health Laws of Ontario, including laws in force in 1893
13th Annual Report of the Provincial Board of Health of Ontario, year 1894.

Bureau of Education, Washington, D. C.:
Report of the Commissioner of Education, year 1892-93, Vol. 2.
Science of Nutrition. The Art of Cooking by the Alladdin Oven.

Bureau of Health, Brussels, Belgium:
Annuaire Demographique et Tableaux Statistiques des Causes de Deces, 1895.

Bureau of Municipal Hygiene, Havre, France:
Mortality Tables for Havre, France, year 1895.

Bureau of Statistics, Frankfurt am Main, Germany:
Civilstand der Stadt Frankfurt am Main, year 1895.

Bureau of Statistics, Agricultural Department, Rome, Italy:
Cause de Morte Statistica degli Anni 1893 E 1894.

Burkhardt, Dr. Lewis, Indianapolis, Ind.:
Bacteria of the Vagina and their Influence on the Course of the Puerperal State.

Burrows, Dr. J. G., Sec., Melbourne, Australia:
20th Annual Report of the Australia Health Society, 1894-95.
Hereditary Disease.

Burrows, Hon. Julius C., Washington, D. C.:
Transactions of the First Pan-American Medical Congress, Washington, Sept., 1893, Vol. 1.
Transactions of the First Pan-American Medical Congress, held at Washington, D. C., Sept., 1893, Vol. 2.

Catellier, Dr. L., Health Officer, Quebec, Canada:
Report of the work done by the Board of Health of the city of Quebec, years 1893-94.

Carasso, Col. G. M., M. D., Director of the Military Hospital, Genova, France:
Nouvelle Methode de Traitment de la Tuberculose Pulmonaire.

Caverly, Dr. C. T., Rutland, Vermont:
Notes on an Epidemic of Acute Anterior Poliomyelitis.

Celli, Prof. Angelo, Director, Rome, Italy:
Regolamento per la Sanita Morittuna.
Sult Azione che it Sero de Sangue di Alcani Ammali Spisga Cantio la Proprita Sporificatrice del Bacillo del Carbonchio.
Sulla Preparazione del Sero Anticarbonchioso.
Sulla Sterilizzarzione de Miscele Liquid incompatibili ad elevata temperatura.
Cemento, Terra Cotta e Gres come Materiali di Turbatura per le Acque Potabili.
Circa i Fatti Principali Riguardanti L' Igrene e la Sanita Pufflica nel Regno nel secondo semestre dell. anno 1895.
Contributo alla Analisi Chimico-Legali del Latte.
Contributo allo Studio del Bacterium Coli Commune.
Sul Risanamento della di Forli.
Sulla Immunita Centro la Diftente Conferita agli Animali.
Della Sofisticazione del Pane e delle Paste Alimentari can i Prodotti del maiz Bianco.

Chalmers, Dr. A. K., Junior Medical Officer, Glasgow, Scotland:
Report on Certain Associated Cases of Enteric Fever.

Chapin, Dr. Charles V., Supt., Providence, R. I.:
14th Annual Report of Births, Marriages, and Deaths, Providence, R. I., year 1894.
12th Annual Report of the Superintendent of Health of the City of Providence, year 1894.
13th Annual Report of the Superintendent of Health of Providence, R. I., year 1895.

Chase, Dr. H. Lincoln, Health Officer, Brookline, Mass.:
Report of the Board of Health of Brookline, Mass., year ending Jan. 31, 1896.
Efficient Disinfection.
Improved Public Bathing Facilities, at Brookline, Massachusetts. Report of Committee Oct. 24, 1895.

Children's Free Hospital Association, Detroit, Mich.:
8th Annual Report of the Children's Free Hospital Association.

Christman, Dr. J. D., Health Officer, Allentown, Pa.
Annual Report of the Board of Health of Allentown, Pa., year 1894.

Christie, W. H. M., Astronomer Royal, Greenwich, England:
Greenwich Meteorological Observations, Part III. Temperature 1841-1890.
Greenwich Magnetical and Meteorological Observations, 1892.

Civil Service Commission, Washington, D. C.:
11th Annual Report of the United States Civil Service Commission, year ending June 30, 1894.

Clark, William B., Director, Baltimore, Md.:
2nd Biennial Report of the Maryland State Weather Service, years 1894-95.

Cochran, Dr. Jerome, State Health Officer, Montgomery, Alabama:
Report of the Board of Health of the State of Alabama.

Cokenower, Dr. J. W., Sec., Des Moines, Ia.:
Transactions of the Iowa State Medical Society, year 1894.

Collins, Alfred S., Librarian, Rochester, N. Y.:
10th Annual Report of Reynolds' Library, Rochester, New York, year 1895.

Cone, James B., Sec., Hartford, Conn.:
72d Annual Report of the Officers of the Retreat for the Insane, Hartford, Conn., April, 1896.

Conn, G. P., Sec. Concord, N. H.:
Transactions of the New Hampshire Medical Association, year 1895.

Coulthard, Dr. Geo. E., Sec., Fredericton, N. B.:
9th Annual Report of the Provincial Board of Health of New Brunswick, year 1895.

Crandall, Prof. C. L., C. E., Ithaca, N. Y.:
Transactions of the Association of Civil Engineers, Cornell University, year 1894.

Crandall, Dr. H. A., Health Officer, Burlington, Vt.:
Annual Report of the Health Officer of Burlington, Vermont, Jan. 1, 1896.

Crane, Henry W., Sec., New York, N. Y.:
125th Annual Report of the Society of the New York Hospital, year 1895.

Crudden, Fred. M., Librarian, St. Louis, Mo.:
Annual Report of the St. Louis (Mo.) Free Public Library, year 1894-95.

Cruls, L., Director, Rio de Janeiro, Brazil:
Annuario Publicado pelo Observatario do Rio de Janeiro, 1896.
Determinaçao das Pasições Geographicas.
Eclipses du Soleil et Occulations.
O'Clima do Rio de Janeiro, Brazil.

Dewey, Melvil, State Librarian, Albany, N. Y.:
State Library Bulletin. Legislation No. 6, December, 1895. Legislation by States in 1895.

Bureau of Statistics, Berlin, Germany:
Veroffenklichungen des Statistischen Arnts der Stadt Berlin, 1894—Supp. I.

Director of the Imperial Bureau of Health of Berlin, Germany.
Reprint from the Statistics of the Imperial Bureau of health.—Die ursachen der Sterbefalle im Deutschen Reiche während des Jahres 1893.

Director of the Observatory, Rio de Janeiro, Brazil:
Annual of the Royal Observatory at Rio de Janeiro.

Director of the Observatory du Vatican, Rome, Italy:
Publicazioni della Specola Vaticana, Vol. IV.

Dock, Dr. George, Ann Arbor, Mich.:
Goiter in Michigan.

Dryden, John F., Pres., Newark, New Jersey:
Address before the Committee on Insurance of the Mass. Legislature, March, 1895.

Duffield, W. W., Director, Washington, D. C.:
United States Coast and Geodetic Survey. Report for 1894, Part II.

Dyer, Edwin L., Sec., Portland, Maine:
Annual Report of Board of Health of the city of Portland, Maine, year 1894-95.

Dykes, Dr. Henry A., Sec., Topeka, Kansas:
10th Annual Report of the Kansas State Board of Health, year 1894.

Emery, Dr. Z. Taylor, Commissioner, Brooklyn, N. Y.:
Report of the Health Department of Brooklyn, New York, year 1894.

Evans, Dr. James, Sec., Florence, S. C.:
16th Annual Report of State Board of Health of South Carolina, year ending October 31, 1895.

Farnaham, Dr. Edwin F., Medical Inspector, Cambridge, Mass.:
Annual Report of the Cambridge Board of Health, year 1895.

Ferguson, Dr. E. D., Sec., Troy, N. Y.:
Transactions of the New York State Medical Association, Vol. 11, 1894.

Foote, Dr. Charles J., New Haven, Conn.:
A Bacteriologic Study of Oysters, with Special Reference to them as a source of typhoid infection.

Foster, Dr. Ed. J., Treas., Mass.:
A catalogue of the Officers and Fellows, Honorary, Active and Retired from upon the rolls Jan. 1, 1896, Mass. State Medical Society.

Foster, Dr. Eugene, President, Augusta, Ga.:
17th Annual Report of the Board of Health of Augusta, Ga., year 1894.

Foster, William E., Librarian, Providence, R. I.:
18th Annual Report of the Providence Public Library, year ending December 31, 1895.

Francois, Theo. Consulat de Belgique à Detroit, Detroit, Mich.:
Bulletin Special du Service de Santé et de Hygiene Publique, 1893.
Bulletin Special du Service de Santé et de Hygiene Publique, 1894.
Bulletin Special du Service de Santé et de Hygiene Publique, Jan., 1895.
Bulletin Special du Service de Santé et de Hygiene Publique, Feb., 1895.
Bulletin Special du Service de Santé et de Hygiene Publique, March, 1895.
Bulletin Special du Service de Santé et de Hygiene Publique, April, 1895.
Bulletin Special du Service de Santé et de Hygiene Publique, May, 1895.
Bulletin Special du Service de Santé et de Hygiene Publique, June, 1895.
Bulletin Special du Service de Santé et de Hygiene Publique, July, 1895.
Bulletin Special du Service de Santé et de L'Hygiene Publique, August, 1895
Bulletin Special du Service de Santé et de L'Hygiene Publique, Sept., 1895.
Rapports addressés a M. Le Ministre De L'Interieur, Vol. VI, 1880-1884.
Rapports addressés a M. Le Ministre De L'Interieur et De L'Instruction Publique, Vol. VII, 1885-1887.
Rapports des Commissions Médicales Provinciales sur Leurs Travaux Pendant L'Année 1890.
Rapports des Commissions Médicales Provinciales sur Leurs Travaux Pendant L'Année 1891.
Rapports des Commissions Médicales Provinciales sur Leurs Travaux Pendant L'Année 1892.
Rapports des Commissions Médicales Provinciales sur Leurs Travaux Pendant L'Année 1893.
Rapports des Commissions Médicales Provinciales sur Leurs Travaux Pendant L'Année 1894.
Recueil des Rapports, Vol. VIII, 1888-1889.
Recueil des Rapports, Vol. IX, 1890-1892.

Frazer, Dr. E. B., Wilmington, Del.:
8th Biennial Report of the Board of Health of the State of Delaware, years 1892-94.

Frazer, Dr. H. D., Sec., Florence, S. C.:
15th Annual Report of the State Board of Health of South Carolina, year 1894.

Freeman, Dr. Rowland G., New York City:
Pasteurized Milk as Supplied to the Poor at the Straus Milk Depot of New York.
Sterilization of Milk at 75° C. (167° F.) and its efficiency in destroying pathogenic organisms.

French, Hon. William A., Land Commissioner Lansing, Mich.:
Report of the State Land Commissioner for the year 1895.

Fyfe, Peter, Chief Sanitary Inspector, Glasgow, Scotland:
25th Annual Report of the Sanitary Department of the city of Glasgow, year 1894.

Geissler, Dr. Arthur, Director, Dresden, Saxony:
Calendar and Statistical year book Kingdom of Saxony, 1896.

Gerhard, W. Paul, C. E., 36 Union Square, New York City:
The laying-out of Cities and Towns.
Sanitary Engineering.
Street-Pavements from a Sanitary Point of View.
The Work of a Sanitary Engineer in time of Epidemics, in time of War, and in Sudden Calamities in Civic Life.

Gibert, Doctor, Chief, Havre, France:
Report of the Chief of the Bureau of Hygiene, Havre, France, 1894.
Report of the Bureau of Public Health of the City of Havre, France, year 1895.
Report of the Municipal Bureau of Hygiene, Havre, France, year 1895.

Giddings, Theron F., Commissioner, Lansing, Mich.:
Michigan Insurance Report, year 1895.

Gleason, C. H., City Clerk, Kalamazoo, Mich.:
Annual Reports of the City of Kalamazoo, year 1895.

Goler, Dr. G. W., Chief Inspector, Rochester, N. Y.:
The Sanitation of Rochester.

Gato, Dr. Shimpei, Director, Tokyo, Japan:
Annual Report of the Central Sanitary Bureau of Japan, 1892.

Hachenberg, Dr. G. P., Austin, Texas:
Medical Consultation Book.

Haldeman, Dr. F. D., Sec., Lincoln, Neb.:
Biennial Report of the Nebraska State Board of Health with a list of Licensed Physicians, January 1, 1893.

Hamao, Arata, Pres., Tokyo, Japan:
The Imperial University Calendar, year 1894.

Hammet, Dr. Charles M., Health Officer, Washington, D. C.:
Report of the Health Officer of the District of Columbia, 1894.

Harrington, Prof. Mark W., Chief, Washington, D. C.:
Report of Chief of U. S. Weather Bureau for 1893.
Information relative to the Investigation of the influence of Climate on Health. Circular No. 4, Sanitary Climatology.

Harris, Wm. T., Commissioner, Washington, D. C.:
Report of the United States Commissioner of Education, year 1892-93, Vol. I.

Hawley, Dr. D. C., Sec., Burlington, Vt.:
Transactions of the Vermont State Medical Society for the year 1894.

Heffron, Dr. John L., Syracuse, New York:
Shall the State Undertake to Restrict the Spread of Tuberculosis?

Henry, Dr. Fred. P., Librarian, Philadelphia, Pa.:
Transactions of the College of Physicians of Philadelphia, Vol. 17, year 1895.

Hersey, Dr. George D., Sec., Providence, R. I.:
Transactions of the Rhode Island State Medical Society, Vol. V, Part I, 1894.

Hewitt, Dr. Charles N., Sec., St. Paul, Minnesota:
15th Annual Report of the Minnesota State Board of Health, year 1893-94.

Hibbard, Dr. James F., Richmond, Indiana:
13th Annual Report of the State Board of Health of Indiana, year 1894.

Hills, J. H., Director, Montpelier, Vt.:
8th Annual Report of the Vermont Agricultural Experiment Station, year 1894.
"Gluten Feeds and Meals".—Bulletin No. 48.—Vermont Agricultural Experiment Station

Hodgman, F., Sec., of the State Engineering Society, Climax, Michigan.
Modern Methods of Supplying Cities with Pure Water, and Water Purification. Two papers.

Homan, Dr. George, Commissioner, St. Louis, Mo.:
Report of the Health Commissioner of St. Louis, Mo., year ending March, 1895.

Horlbeck, Dr. A. B., Health Officer, Charleston, S. C.:
Annual Report of the Department of Health of Charleston, S. C., year 1894.

Hubbard, Dr. Thomas, Sec., Toledo, Ohio:
Transactions of the Ohio State Medical Society, year 1895.

Iddings, Dr. A. H., Dayton, Ohio;
Annual Report of the Board of Health, Dayton, Ohio, year 1894.

Imperial Bureau of Health, Berlin, Germany:
Die Heilanstalten des Reichs nach den Erhebungen der Jahre 1889, 1890, und 1891.

Imperial Bureau of Statistics, Berlin, Germany:
Die Thätigkeit der im Deutschen Reiche errichteten Staatlichen Anstalten zur Gewinnung von Thierlymphe während des Jahres 1894.
Blattern and Schutzpockenimpfang
Die Ergebnisse des Impfgschäfts im Deutschen Reiche, für Jahr 1873
Die Thätigkeit der im Deutschen Reiche errichteten Staatlichen Anstalten zur Gewinnung von Thierlymphe während des Jahres 1895.
Ergebnisse der amtlichen Bodentodes sallstatistik im Deutschen Reiche vom Jahre 1894.
Statistical Year Book of the Imperial Bureau of Statistics, Berlin, 1895.
Imperial Bureau of Statistics, Jahrgang, 1896. Zweites Heft.

Interior Department, Scientic Laboratory, Rome, Italy:
Circo i Fatti Principali Riguardanti L'Igiene e la Santa Publica nel Regno nel secondo semestre déll anno 1895.
Sulla Decomposizione dell'acido Ippurico per Mezzo dei Microorganism.

International News Company, New York, N. Y.:
Diary for 1896—Sanitary Record.

Janssens, Dr. E., Chief of the Bureau of Hygiene, Brussels, Belgium:
Annuaire Demographique et Tableaux Statistiques des Causes dècés.
Rapport presenté Au Conseil Communal en seance du 7 Octobre, 1895.

Johnson, E. Bird, Registrar, Minneapolis, Minn.:
Catalogue for the University of Minnesota, year 1895-96.—Announcement, year 1896-97.

Judson, Dr. A. B., Statistical Sec., New York City:
Transactions of the New York Academy of Medicine, Vol. 10, 1894.

Kellogg, Dr. J. H., Battle Creek, Michigan:
Importance of Intestinal Asepsis and Antisepsis in Abdominal Surgery.

Kelly, Florence, Chief Inspector, Springfield, Ill.:
2nd Annual Report of Factory Inspectors of Illinois, year ending Dec. 15, 1895.

Kennedy, Dr. J. F., Sec., Des Moines, Iowa:
Report of the Iowa State Board of Health, year 1895.

Kimball, Sumner I., General Superintendent, Washington, D. C.:
Report of the Life Saving Service, fiscal year ending June 30, 1894.

Kimberlin, Miss N. D., Detroit Public Schools, Detroit, Michigan:
Course of Study in Physical Culture and Physiology, Detroit Public Schools.

Kirkpatrick, Dr. Thos., Sec., Topeka, Kansas:
11th Annual Report of the State Board of Health of Kansas, year 1895.

Knight, Dr. W. W., Clerk of Board of Health of Hartford, Conn.:
11th Annual Report of the Board of Health of Hartford, Conn., year ending Feb. 28, 1896.

Kobayashi, K., Director of the Observatory of Japan, Tokyo, Japan:
Annual Report of the Central Metoerological Observatory of Japan, year 1894, Part I.

Laine, Dr. J. R., Sec., Sacramento, Cal.:
Circular No. 5, California State Board of Health relative to the Prevention of Consumption.
Proceedings of the 3d Annual Sanitary Convention, San Francisco, Cal.. April 15, 1895.

Laing, Dr. Roland, Commissioner, Reading, Pa.:
Report of Board of Health of Reading, Pa., year 1895.

Larberge, Dr. Louis, Medical Health Officer, Montreal, Quebec:
Report of the Sanitary State of Montreal for the year 1894.

Lavender, Dr. W. R., Sec., Omaha, Nebraska:
Transactions of the Nebraska State Medical Society, years 1893 and 1894.

Longo, Bartaldo, Rome, Italy:
Calendario del Santurio de Pompei, 1896.

Lee, Dr. Benjamin, Sec., Philadelphia, Pa.:
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Report of the Pennsylvania State Board of Health, year 1894.

Leick, Dr. Geo. F., Health Officer, Cleveland, Ohio:
22d Annual Report of the Health Division of the City of Cleveland, Ohio, year 1894.

Lewis, Dr. Richard H., Sec., Raleigh, N. C.:
Reports of the State Health Department of Raleigh, North Carolina, for the two years ending Feb. 28, 1894, 1895.

Library, Springfield, Illinois:
Report of the Trustees of the Newberry Library, year 1893-94.

Lockwood, Jos. A., Clerk, Yonkers, N. Y.:
33d Annual Report of the Board of Water Commissioners, Yonkers, New York, year 1895.

Lindsley, Dr. C. A., Sec., Hartford, Conn.:
Report of the Connecticut State Board of Health, year 1895.
Report of the Outbreak of Typhoid Fever at Wesleyan University.
Report on the Stamford Typhoid Fever Epidemic. (Conn.)

Marchand, P. A., Librarian, Cincinnati, Ohio:
25th Annual Report of the Cincinnati Hospital, year 1895.

Mason, Prof. W. P., Troy, New York:
Fatal Poisoning by Carbon Monoxide.

McGowan, Dr. J. J., Sec., Memphis, Tenn.:
16th Annual Report of the Board of Health of Memphis, year 1894.

McLeod, Dr. Duncan, Detroit, Mich.:
Annual Report of the Sanitary Department of the Board of Health, year 1894.

McShane, Dr. James F., Commissioner, Baltimore, Maryland:
Annual Report of the Health Commissioner of Baltimore, Maryland, year 1895.
Weekly Mortuary Reports, Baltimore, Md., year 1890.

Mendenhall, T. C., Superintendent, Washington, D. C.:
United States Coast and Geodetic Survey, Report for the year 1893, Part 2.

Michele, Dr. C. G., Rome, Italy:
Nuovo Metodo de Cura della Tuberlosi Pulmonare.

Mitchell, Dr. Henry, Trenton, N. J.:
Report of the New Jersey State Board of Health, year 1895.

Morse, Hon. Charles H. Commissioner, Lansing, Mich.:
3rd Annual Report of the Commissioner of Labor relative to Factory Inspection, Michigan, year 1895.
13th Annual Report of the Bureau of Labor, Michigan, year 1896.

Morse, W. F., Pres., Engle Garbage Co., New York City:
Household Garbage Carbonizer.

Montizambert, Dr. Frederick, Supt. Quebec, Canada:
Annual Report of the Superintendent of St. Lawrence Quarantines, October 31, 1894.

Murphy, Dr. John B., Chicago, Ill.:
Analysis of Cases operated on with the aid of the Murphy Button up to the present time.

Paquin, Dr. Paul, St. Louis, Mo.:
Serum-Therapy in Tuberculosis.

Peckham Chas. H., Sec., Providence, R. I.:
27th Annual Report of the Board of Corrections and Charities, R. I., year 1895.

Peek, Cuthbert E., M. A., Director, Devon, England:

Ramsdon Observatory, Devon, England, Vol. XI. Meteorological Observations, year 1894.

Pelletier, Elzear, Quebec, Quebec:

Report of the Provincial Board of Health of Quebec, year 1895.

Platt, S. S., Civil Engineer, Rochdale, England:

Reports of the Various Committees of the Council of the Borough of Rochdale, England, year ending March 25, 1895.

Utilization of Town Refuse at Rochdale.

Porter, M. D., Joseph Y., Sec., Jacksonville, Fla.:

Florida Health Notes, Vol. 2, years 1893–94.

Prendergast, Dr. J. W., Cincinnati, Ohio:

Annual Report of the Department of Health, Cincinnati, Ohio, year 1894.

Probst, Dr. C. O., Sec., Columbus, Ohio:

Public Water Supplies in their Relation to Public Health.

Report of the Ohio State Board of Health, year 1894.

Prudden, Dr. T. Mitchell, New York City:

New Outlook in the Science and Art of Medicine.

Studies from the Department of Pathology of the College of Physicians and Surgeons, Columbia College, New York, Vol. IV.

Reed and Carnrick, New York City:

Protonuclein—Records of Clinical Cases.

Registrar-General, Dublin, Ireland:

31st Annual Report of the Registrar-General of Ireland, year 1894.

Russell, Sir James A., Edinburgh, Scotland:

Proceedings of the Royal Society of Edinburgh, Session 1894, Vol. XX, pp. 481–546.

Proceedings of the Royal Society of Edinburgh, Sessions 1890–91 and 1894–95, Vol. XX, pp. 385–480.

Russell, Dr. J. B., Chief Medical Officer, Glasgow, Scotland:

On the Prevention of Tuberculosis.

The Evolution of the Function of Public Administration as illustrated by the Sanitary History of Glasgow in the 19th Century, especially since 1854.

Sager, Edmund, Sec., Sydney, New South Wales:

Dairies Supervision Act, New South Wales.—Bulletin.

Typhoid Fever in Sydney and Suburbs.—Bulletin.

Salmon, Dr. D. E., Chief, Washington, D. C.:

Cornstalk Disease and Rabies in Cattle.—Bulletin No. 10, Bureau of Animal Industry.

Statistics of the Dairy.—Bulletin No. 11, Bureau of Animal Industry.

How to Select good Cheese.

Investigations concerning infectious diseases in Poultry.

Vivisection in the District of Columbia.

10th and 11th Annual Reports of the Bureau of Animal Industry, years 1893 and 1894.

Saltet, Dr. R. H., Director, Amsterdam, Netherlands:

Report of the Bureau of Health of the City of Amsterdam, Netherlands, year 1894.

Schreiber, Dr. Paul, Director, Chemnitz, Saxony:

Jahrbuch des Königreisch Sachsischen meteorological Institutes, 1894.

Monats und Jahresmittle der Wichtigsten Klimatischen Elemente für den Zeit raum 1864–1890.

Ueber Registrirende Regenmesser und Pegel.

Year book of the Meteorological Institute of the Kingdom of Saxony, year 1894.

Scott, Dr. T. S., Health Officer, Mobile, Alabama:

Annual Report of the Board of Health, Mobile, Alabama, year 1894.

Seward, F. D., Sec., St. Louis, Mo.:

Proceedings of the 12th Annual Conference of the National Association of Confectioners, Saratoga, year 1895.

Secretary of Agriculture, Washington, D. C.:

Dairy Bacteriology, Office of Experiment Station, Department of Agriculture. Circular No. 25.

The Feeding of Animals (Farm). Farmers' Bulletin No. 22. U. S. Department of Agriculture. Alfalfa or Lucern.—Bulletin No. 31.

Meats: Consumption and Cooking.—Bulletin No. 34, Department of Agriculture.

Peanuts: Culture and Uses.

Silos and Silage.—Bulletin No. 32, United States Department of Agriculture.

Souring of Milk and other Changes in Milk Products. Farmers' Bulletin No. 29.

The World's Markets and American Produce. The German Empire. Bull. U. S. Department of Agriculture.

Secretary of State, Lansing, Mich.:

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Secretary of State, Washington, D. C.:

Consular Reports, June, July, Aug., Sept., Nov., Dec., 1895, and Jan., Feb., March, April and May, 1896.

Sheldon, Dr. Charles S., Sec., Madison, Wis.:

Transactions of the Wisconsin State Medical Society, year 1895.

Simmerman, Chas. H., Chief, Trenton, N. J.:

Report of Bureau of Statistics of Labor and Industries in New Jersey, year 1894.

Smith, Dr. Charles D., Sec., Portland, Maine:

Transactions of the Maine Medical Association, year 1895, Vol. XII, Part I.

Smithsonian Institution, Washington, D. C.:

The composition of expired air and its effects upon animal life.

Smock, John C., State Geologist, Trenton, N. J.;

Report of the State Geologist of New Jersey, year 1894, with maps.

Report of the State Geologist of New Jersey, year 1895.

Spuller, M., Senateur, Paris, France:

Ecole Spéciale D'Architecture, Année 1895-1896. Séance D'Ouverture du 11, Nov. 1895.

Snellen, Maurits, Director, Utrecht, Holland:
Year Book of the Royal Meteorological Institute of the Netherlands, year 1893.

St. John, J. E., Supt., Lansing, Mich.:
Biennial Report of the Board of Trustees of the Industrial School for Boys of Michigan, year 1894.

Stalker, Prof. M., V. S., Ames, Iowa:
Investigation of Bovine Tuberculosis, with special reference to its existence in Iowa.

Staples, Dr. Franklin, Health Officer, Winona, Minn.:
Annual Report of the Board of Health of the city of Winona, Minn., year ending March 31, 1896.

Sternberg, Dr. Geo. M., Surgeon General, Washington, D. C.:
Index, Catalogue to Library of the Surgeon General's Office, United States Army, Vol. XVI.

Stewart, Dr. James B., Sec., Baltimore, Md.:
11th Biennial Report of the State Board of Health of Maryland, years 1894-1895.

Stevens, B. F., London, England:
Annual Report of the Sanitary Commissioner with the Government of India, year 1894.

Storrs, Hon. C. E., State Commissioner, Lansing, Mich.:
Compilation of the Laws relating to the Inspection and Adulteration of Foods in Michigan.

Swartz, Dr. Gardner, T., Sec., Providence, R. I.:
Report of the Results obtained with Experimental Filters at Providence, R. I.

Switzer, Dr. B. F., Sec., Albany, New York:
Maps accompanying State Board of Health 15th Annual Report, year 1895.
15th Annual Report of the New York State Board of Health, yea 1895.

Teller, Prof. George L., Fayetteville, Ind.:
Manures, May, 1892, Department of Chemistry, Agricultural College, Fayetteville, Indiana.—Bulletin No. 19.
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Stock Feeding, Department of Chemistry, Agricultural College, Fayetteville, Ind.—Bulletin No. 30.
Syrups and Molasses, Department of Chemistry, Agricultural College, Fayetteville, Indiana.—Bulletin No. 37.

Trinity Church Society, New York City:
Report of the Sanitary Condition of the Tenements of Trinity Church, and other documents.

Tucker, Dr. N. G., Health Officer, Nashville, Tenn.:
21st Annual Report of the Health Officer of the City of Nashville, Tenn., year 1895.

Tucker, Dr. Willis G., Albany, New York:
The Adulteration of Drugs.

Venable, F. P., Sec., Chapel Hill, N. C.:
Journal of the Elisha Mitchell Scientific Society, 1895, First Part.
Journal of the Elisha Mitchell Scientific Society, Part II, year 1895.

Wadlin, Horace G., Chief, Boston, Mass.:
Report of Statistics of Labor, 1894.
Statistics of Manufactures, 1894.

Walker, Dr. J. B., Sec., Philadelphia, Pa.:
Transactions of the American Climatological Association, Vol. 11, year 1895.

Ward, Prof. Robt. De C., Harvard University, Cambridge, Mass.:
Meteorological Observations in Schools.—Bulletin No. 10.—Connecticut Office of Public Instruction.

Waring, Geo. E., Jr., Newport, R. I.:
The Purification of Sewage by Enforced Aeration.

Warry, Dr. J. King, London, England:
Report of the Sanitary Condition of Hackney District (England), year 1894.

Watson, Dr. Irving A., Sec., Concord, N. H.:
List Giving Sanitary Authorities of North America.
13th Annual Report of the State Board of Health of the State of New Hampshire, fiscal year 1894 to July 1, 1895.

Watt, Dr. A. T., Sec., Victoria, B. C.:
1st Report of the Provincial Board of Health of British Columbia for the quarter ending December 31, 1895.

Wilbur, Dr. C. L., Chief, Lansing, Mich.:
27th Registration Report of Michigan, year 1893.

Williams, G. S., C. E., Detroit, Michigan:
44th Report of the Board of Water Commissioners of Detroit, year 1895.

Wilson, Dr. W. A., Sec., Grand Rapids, Mich.:
Annual Report of the Board of Health of Grand Rapids, Mich., year 1894-95.

Woodhead, Dr. G. Sims, Edinburgh, Scotland:
Laboratory Reports, Royal College of Physicians of Edinburgh, Scotland, Vol. 1.

Woods, Dr. J. F., Health Officer, Toledo, Ohio:
Annual Report of the Board of Health of the city of Toledo, year ending December 31, 1894.

Woodward, Dr. William C., Health Officer, Washington, D. C.:
Report of the Health Officer of the District of Columbia, year 1895.

Wyman, Dr. Walter, Supervising Surgeon General, Washington, D. C.:
Annual Report of the Supervising Surgeon General of the United States Marine Hospital Service, fiscal year 1895.
Weekly Abstract of Sanitary Reports, Vol. 10, year 1895.

Young, Dr. A. G., Augusta, Maine:
2nd Annual Report on Births, Marriages, and Deaths, year ending December 31, 1893.

ACCESSIONS BY EXCHANGE.

Received in exchange for Publications of this Board (in some instances incomplete volumes):

American Exchange and Review, Phila.
American Practitioner and News, Louisville, Ky.
Annals of Hygiene, Phila.
Architecture and Building, New York.
Buffalo Medical and Surgical Journal.
Bulletin de L'Academie Royale de Médicine de Belgique, Brussels.
American Lancet, Detroit.
Brooklyn Medical Journal.
Bulletin: Cornell University, Ithaca, N. Y.
    Iowa State Board of Health, Des Moines.
    Florida State Board of Health, Jacksonville.
    Maine State Board of Health, Augusta.
    Mexico National Board of Health, Mexico City.
    Ohio State Board of Health, Columbus.
    North Carolina State Board of Health, Wilmington.
    Rhode Island State Board of Health, Providence.
    Tennessee State Board of Health, Nashville.
    Virginia State Board of Health, Richmond.
Canada Educational Monthly, Toronto.
Canada Lancet, Toronto.
Canadian Practitioner, Toronto.
Cleveland Medical Journal, Cleveland.
College and Clinical Record, Phila.
Columbus Medical Journal, Columbus, Ohio.
Confectioners' Journal, Phila.
Clinical Review, Chicago.
Dietetic and Hygienic Gazette, New York.
Good Health, Battle Creek.
Experiment Station Record, Washington.
Indicator, Detroit.
Fort Wayne Medical Journal.
Journal American Medical Assoc., Chicago.
Journal D'Hygiene, Paris.
Journal Franklin Institute, Phila.
Journal Comparative Veterinary Archives, N. Y.
Lehigh Medical Monthly, Evanston, Penn.
Leonard's Illustrated Medical Monthly, Detroit.
Medical Age, Detroit.
Medical Brief, St. Louis.
Medical Bulletin, Phila.
Medical Counselor, Detroit.
Medical Examiner, N. Y.
Medical and Surgical Reporter, Phila.
Medical Review, St. Louis.
Manufacturer and Builder, New York.
Maryland Medical Journal, Baltimore.
Memphis Medical Monthly, Memphis, Tenn.
Nashville Journal of Medicine, Nashville, Tenn.
New York Medical Journal, N. Y. City.
National Popular Review, Chicago.
Physician and Surgeon, Ann Arbor.
Quarterly Returns of Births and Deaths of Dublin, Ireland.
Quarterly Reports of the Royal Meteorological Society, England.
Revue Internationale Bibliographie, Paris, France.
Sanitary Record, London.
Sei-i-kwai Medical Journal, Tokyo, Japan.
Semena Medica, Buenos Ayres, Argentine Republic.
Tablettes Mensuelles, Brussels, Belgium.
Texas Sanitarian, Austin, Texas.
Veroff. des Kaiserlich Deutschen Gesundheitamtes, Berlin.
Virginia Medical Monthly, Richmond.
Weekly Returns of Births and Deaths, Dublin, Ireland.

ACCESSION BY PURCHASE.

Uric Acid in the Causation of Disease (2nd edition), by Haig.
Standard Dictionary of the English Language, by Isaac K. Funk.
Commitment, Detention, Care and Treatment of the Insane. Proceedings of the International Congress of Charities and Corrections.
Meteorology, by Thos. Russell.
Annual Report of the Sanitary Commissioner of India, year 1893.
Lectures on diseases of the Spinal Cord, by Dr. Pierre Marie.
The Care of the Dependent, Neglected and Wayward.
The Filtration of Public Water Supplies, by Allen Hazen.
Disinfection and Disinfectants, by T. Rideal.
Weather and Disease, by A. B. MacDowell.
Immunity and Serum Therapy, by Geo. M. Sternberg.
Journal of the Sanitary Institute of Great Britain, Vol. 15.
Journal of the Sanitary Institute of Great Britain, Vol. 16.
Ptomaines and Leucomaines, by Vaughan and Novy.
Scientific American and Supplement, N. Y.
U. S. Official Postal Guide and Supplements.
American Journal of Medical Science.
Medical News, of Philadelphia.
Popular Science Monthly.

Nature.
London Lancet.
British Medical Journal.
Sanitarian, Brooklyn.
Sanitary Record, London.
Sanitary Journal, Glasgow.
Science, New York.
Science Progress, England.
Centralblatt für Bakteriologie und Parasitenkunde, Bands 19 and 20, 1896.
American Meteorological Journal.

LOANS FROM THE LIBRARY.

Publications drawn out, and not yet returned, are as follows:

PROF. R. C. KEDZIE, AGRICULTURAL COLLEGE, MICHIGAN.

Annual Report National Board of Health, 1879 (Library No. 2825).

HENRY F. LYSTER, M. D., DETROIT, MICHIGAN.

Separate System of Drainage (Library No. 326).
Public Health, June 9, 1876 (Periodical).
Uppingham Bye-laws and Regulations on House Drainage (Library No. 966).
Oct., Nov., and Dec. Nos. of "Plumber and Sanitary Engineer" (Periodicals).
Statement of Objects of Sanitary Protective Assoc., Edinburgh (Pamphlet.)
Playter's Elementary Anatomy and Physiology and Hygiene (Library No. 1762).
Sewerage at Providence, R. I., by Waring
Storm Water in Town Sewerage, by Waring.
Sewerage of Cities, by Waring.
Separate System of Sewerage, by Waring.
Climatic Treatment of Consumption (Library No. 6238).
Medical Communications of Mass. Med. Society.
The Philanthropic Index and Review, June, 1889.
Sequin on Lunacy.
New Facts and Remarks on Idiocy, by Seguin.
Children of the State (Library No. 5545).
Conference of Corrections and Charities, Omaha, 1887.

C. L. WILBUR, M. D., LANSING, MICHIGAN.

Hirche's Handbook of Historical Pathology (Library No. 5822).
Weather and Diseases, by MacDowell (Library No. 9734).
Trans. College of Physicians and Surgeons, Vol. 17 (Library No. 9739).
Fecundity, Fertility, and Sterility, by Duncan (Library No. 194).
London Lancet, July-Dec., 1895 (Library No. 9791).
Reference Handbook of Medical Sciences, Vol. VI (Library No. 6689).
The Genuine Works of Hippocrates, by Adams (Library No. 8053).
Practical Hygience, by Park (Library No. 7262).
Suicide, by Morselli (Library No. 4171).
Handbook of British Fungi, by Cooke, Vol. 1 (Library No. 93).

H. W. DAVIS, LAPEER, MICHIGAN.

Purification of Sewage and Water (Library No. 7778).
24th Ann. Report Mass. State Board of Health (Library No. 8782).
25th Ann. Report Mass. State Board of Health (Library No. 9317).

J. F. JENKINS, TECUMSEH, MICHIGAN.

Trans. American Climatological Society, Vol. 11, 1895 (Library No. 9741).

HON. FRANK WELLS, LANSING, MICHIGAN.

Immunity and Serum Therapy, by Sternberg (Library No. 9759).
Report National Pure Food Commission, 1887.
Medical News, Vol. 59, issues for July 18 and 25, 1891.
British Medical Journal, Supplement for July 20, 1891 (Current No.).

C. C. YEMANS, M. D., DETROIT, MICHIGAN.

Report of Plan of Securing Records of Deaths, by Harris.
State Board of Health, Indiana, etc., by Stevens (Pamphlet).
Some Fallacies on Statistics, by Rumsey.
Death-rate of Each Sex in Michigan, by Baker.

PROF. DELOS FALL, ALBION, MICHIGAN.

Report of the American Public Heath Assoc., (Library No. 993).
4th Ann. Report of State Board of Health, of South Carolina, 1893.

HENRY B. BAKER, M. D., LANSING, MICHIGAN.

Journal D'Hygiene (French) for Sept., 1881 (Current No.).
Vol. 35, Trans. London Medical Chirurgical Society (Library No. 2642).
N. Y. Medical Abstract, April, 1883 (Current No.).
College and Clinical Record, May 1, 1884 (Current No.).
The Typhoid Fever of America (Library No. 3905).
Jour. Franklin Institute, Nov., 1884 (Current No.).
Buffalo Medical and Surg. Jour., Aug., 1885 (Current No.).
Communications to Mass. Medical Society, Vol. 10, 1862.
Manufacturer and Builder, March, 1879 (Current No.).
Ventilation and Warming of Buildings, Morrison (Library No. 7147).
Education and Culture of Women as Relates to Health and Diseases of Women (Library No. 7470.)
U. S. Quarantine Laws and Regulations, Feb. 24, 1893 (Library No. 8538).
Immigration Laws and Regulations, March 11, 1893 (Library No. 8558).
Annual Report St. Lawrence Quarantine, by F. Montizambert, M. D., Supt.
Confectioners' Jour., Jan., 1894 (Current No.).
National Popular Review, March, 1894 (Current No.).
Uric Acid in Causation of Disease, Haig (Library No. 9348).

PROF. S. W. BAKER, BIG RAPIDS, MICHIGAN.

Sanitary Papers of the General Meeting.
Trans. Amer. Social Science Assoc., 1874 (Library No. 878).
Report of Com. Concerning Sanitary Condition of Schools in Phila. (Library No. 1767).
Trans. Sanitary Institute of Great Britain, 1879 (Library No. 4688).

WILL C. HUME, M. D., CORUNNA, MICHIGAN.

Three Communications, by Paul Gibier, M. D., Paris (Library No. 7716).

CHARLES H. BRUCKER, M. D., LANSING, MICHIGAN.

Fothergill's Handbook of Treatment (Library No. 1026).

THEO. R. MAC CLURE, LANSING, MICH.

Principles of Biology, Spencer (Library No. 707).
The Story of the Bacteria, Prudden (Library No. 7137).
Bacteria and Their Products, Woodhead (Library No. 8074).
Medical News, Vol. 64, June 16, 1894 (Current No.).
A. J. Graham's Phonetic Dictionary (Library No. 8754).
American Text-Book of Diseases of Children (Library No. 9324).
Materia Medica and Therapeutics (Library No. 668).
Practice of Medicine, Vol. 1, Fagge (Library No. 6727).
Practice of Medicine, Vol. 2, Fagge (Library No. 6728).
Practical Biology, Huxley and Martin (Library No. 2143).
Text-Book on Zoölogy, Nicholson (Library No. 155).
Miscroscopical Technology, Friedlander (Library No. 5383).
Longstaff's Statistics (Library No. 7645).
Revue Inter. Bibliographie, Vol. 2, 1892 (Library No. 9063).

A. W. NICHOLSON, M. D., NEWBERRY, MICHIGAN.

General Biology, by MacGinley (Library No. 92).
Principles of Mental Physiology, by Carpenter (Library No. 103).
Study of Biology, by Nicholson (Library No. 154).
Insanity; its Causes and Prevention, by Sterns (Library No. 3955).
Functions of the Brain, by Ferrier (Library No. 715).
Detention, Care and Treatment of Insane (Library No. 9351).

JOHN HEVENER, LAPEER, MICHIGAN.

Hospitals: Their Organization and Construction (Library No. 3806).
Cottage Hospitals, by Burdette (Library No. 2470).

HOWARD B. BAKER, LANSING, MICH.

Gould's Medical Dictionary (Library No. 7744).

SAMUEL G. MILNER, M. D., GRAND RAPIDS, MICHIGAN.

Treatise on Hygiene, Stevenson and Murphy (Library No. 8269).

The following table shows the amount and kind of hard paper there was on hand at the time of making the last report, the amount purchased during the year, the amount used, and the amount now on hand:

Kind of Paper.	On hand at last Report.		Purchased since last Report.		Used during the fiscal year.		On hand June 30, 1896.	
	Reams.	Sheets.	Reams.	Sheets.	Reams.	Sheets.	Reams.	Sheets.
Flat	2	313	--------	--------	--------	408	1	385
Crown	11	418	10	--------	13	96	8	322
Folio-Post	16	339	40	--------	35	441	20	378
Demy	5	402	4	--------	4	421	4	461
Medium	3	200	--------	--------	--------	90	3	110
Byron Weston	--------	145	--------	--------	--------	11	--------	134
Imperial	1	--------	--------	--------	--------	--------	1	--------
B. Hornet (linen)	--------	--------	4	240	2	240	2	--------
School Cap	--------	200	2	--------	--------	200	2	--------
Legal Cap	1	30	--------	--------	--------	18	1	12
Blotting paper	--------	--------	1	--------	--------	140	--------	340
Blue cover paper	12	153	--------	--------	1	153	11	--------
Postoffice paper	1	200	--------	--------	--------	--------	1	200
Book paper, S. S. C. White	3	59	--------	--------	--------	80	2	459
Manilla paper	4	44	2	--------	3	404	2	120

There are now on hand 7,590 sheets of hard paper of half-letter size, 200 sheets of note size, 600 sheets of half note size. There were about 142,099 envelopes on hand at the time of making the last report, 60,125 of the various kinds used in the office have been purchased since, making a total of 202,224. There are now on hand 65,048 printed envelopes, and 84,380 blank envelopes, making a total of 149,428; about 52,796 have been used in the work of the office during the fiscal year.

Postage money on hand at beginning of fiscal year (July 1, 1895), $208.07. Vouchers for postage (for use in the office) have been allowed during the year to the amount of $976.00. Postage money on hand at end of fiscal year (June 30, 1896), $5.68. The cost of postage during the fiscal year ending June 30, 1896, was $1,178.39, as follows:—

Distribution of Annual Reports	$473.12
General distribution of small pamphlets and circulars	192.88
Sending Weekly and monthly bulletins	43.17
Collection and dissemination of information in regard to communicable and other diseases	137.51
Sending announcements and programs for sanitary conventions	11.10
Sending meteorological material to observers	8.87
Work in connection with collection of sickness statistics	41.26
Securing annual reports from health officers and clerks	29.31
Securing the name and postoffice addresses of health officers	50.37
Distribution of school literature to teachers and others	36.68
Regular and special correspondence of the office, postal cards, and all other postage (including a considerable amount for distribution of documents on the restriction of diphtheria, scarlet fever, small-pox, etc., to localities where those diseases occurred)	154.12
	$1,178.39

TOTAL AMOUNT AND CLASSIFICATIONS OF EXPENDITURES BY THE STATE BOARD OF HEALTH, AS PER VOUCHERS 2575-2687, INCLUSIVE, EXCEPT NOS. 2619 AND 2666, ALLOWED DURING THE FISCAL YEAR ENDING JUNE 30, 1896.

Chemical Analyses	
Expenses of Members:—	
Attending Meetings	$118.41
Other Official	27.25
Instruments and books	215.90
Paper, Stationery, etc.	527.87
Postage:—	
Office	976.00
Members	2.00
Printing and Binding	927.98
Secretary	3,000.00
Expressage	548.97
Telegrams	13.59
Telephones	24.00
Miscellaneous	440.16
Special Investigations	3.20
	$6,825.33

EXPENDITURES BY THE STATE BOARD OF HEALTH IN THE CALENDAR YEAR, 1895.

The foregoing is reported, in compliance with law, relative to the fiscal year. But the appropriations of the Board are for the calendar year, and they amount to six thousand dollars. The expenditures for any calendar year, therefore, cannot exceed six thousand dollars. The following is a classified statement of expenditures for the calendar year 1895.

CLASSIFIED STATEMENT OF EXPENDITURES BY THE BOARD DURING THE CALENDAR YEAR, 1895.

Chemical Analyses	
Expenses of Members:—	
Attending Meetings	$173.91
Other Official	40.55
Instruments and books	79.14
Paper, Stationery, etc.	397.39
Postage:—	
Office	950.00
Members	1.00
Printing and Binding	442.78
Secretary	3,000.00
Expressage	314.90
Telegrams	12.74
Telephone	33.25
Miscellaneous	553.81
	$5,999.47

EXPENDITURES ON ACCOUNT OF THE BOARD.

The appropriations ($6,000) at the disposal of the State Board of Health are for certain specified purposes, not including clerk hire, the publication of the annual report, or the expenses in the examination of plans for public buildings; these expenditures *on account of* but not by the Board are provided for by other acts of the legislature than those appropriating money to be expended by the Board, and the accounts are kept in other offices; not in the Office of the State Board of Health; the accounts for clerk hire are kept by the Auditor General, and are reported in his annual report; the accounts for publication of the annual report of this Board, and for expenses in the examinations of plans for public buildings, are kept by the Board of State Auditors, and are published in the annual report of that Board.

Respectfully submitted,

HENRY B. BAKER,
Secretary.

A PLEA FOR THE TEACHING OF SANITARY SCIENCE IN OUR SCHOOLS.*

BY PROF. DELOS FALL, MEMBER MICHIGAN STATE BOARD OF HEALTH, ALBION.

An eminent prime minister of England once said, "The health of the people is the first duty of the Statesman," and Herbert Spencer in his essay on Education, discussing the subject, "What knowledge is of most worth"? declares that in order of importance those activities which directly minister to self preservation must clearly take precedence of all others. He goes on to say that under this head are those actions and precautions by which from moment to moment we secure personal safety. This was not a new truth, but it required the influence of the noted essayist to make it seem anything other than a new discovery.

It is a matter of congratulation that there is a rapidly increasing interest in matters pertaining to public health, to the restriction and prevention of disease, to the saving of human life, through the agencies of sanitary science. There are many more in our day than formerly who believe that, to a large extent, contagious diseases can be met and fought in a practical manner in every day life. It is rapidly being brought to the knowedge of thinking men that the subject of the preservation of our health is a very practical matter and that by studying the cause and origin of disease and death it will be found that much of it can be prevented by very simple rules. This being so we must confess that we ourselves, either by ignorance or indifference are indirectly, if not altogether responsible for much of suffering and distress which could easily be avoided. For example it can be shown by reliable statistics in cases of outbreaks of diphtheria that by the faithful application of the simple rules of isolation and disinfection the number of cases of those who will be sick, on the average, for each outbreak of such disease in our State, will be only two persons while the neglect of these means will result, and does result, on the average over our State, of over thirteen cases per outbreak. Having in mind that at the present time to properly restrict the first cases in each outbreak would represent an aggregate saving of over three thousand cases of sickness per year from this one disease, the matter will appeal to us as one of such general importance as to deserve consideration.

It will be understood at once that the entire program this morning is in the interest of a new law enacted by the last legislature, a law which from the standpoint of those who have given the subject long and serious study is fraught with immense good to the future of the human race, not only to the people of Michigan but as the idea spreads, to the race as a whole. Indeed there is abundant evidence accumulating already that the idea has taken root in other States.

Edward O. Shakespeare, M. D., Ph. D., of Philadelphia, one of the most prominent workers for the advancement of public-health work in this country, and editor of "The Dietetic and Hygienic Gazette," in an editorial in the December number of his Journal, has this to say:—

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* A paper read before the Michigan Schoolmaster's Club, at Ann Arbor, March 27 1896.

"The State Board of Health of Michigan has entered seriously and deliberately upon a campaign of popular education in hygiene as the most comprehensive and at the same time surest permanent way of restricting and preventing epidemic and contagious diseases in that State.

"We reprint in another column a sample of the manner in which the Michigan health officers are conducting this campaign of education within their borders. This work in sanitation of our Northwestern friends is truly fundamental and is well worthy of emulation elsewhere. It has already received the unstinted praise of some of our Parisian contemporaries, and it should be repeated and improved upon if possible by other boards of health, both State and municipal, all over our country.

"The sanitary work in Michigan, directed by an efficient and zealous Secretary of the State Board of Health, backed and aided in every manner by an intelligent and judicious membership, has for years attracted the attention of American sanitarians in many ways. As a general result of this persistent, systematic labor the morbidity and mortality from most of the severe epidemic and contagious diseases have been very materially lessened. One of the first aims set up by the State Board of Health of Michigan for attainment was the planning and execution of a campaign of education among the law-makers of their State. That this one of their primary aims has been in a large measure accomplished, the health code of their State and the very considerable power and authority vested in the State Board of Health under their laws amply testify. To have secured the enactment of adequate laws is to have accomplished very much indeed; and to have received the moral support of the executive department of the State government is to have reinforced greatly their power and authority.

"But the enrolment of adequate laws upon the statute books, the selection of competent officials to execute them, and the display of zeal and intelligence in their administration, constitute only half the forces to be arrayed in the great battle of sanitation and preventive medicine against the inroads of infection and contagious diseases; and, however strong such a combination may be, it alone can never be sure to win victories which are complete, decisive, and permanent. The other half is the people. If properly instructed and directed, *that* is by far the strongest and most effective contingent; if the spirit of ignorance and rebellion permeate its ranks extensively, *it* is capable of minimizing or even nullifying at times all the efforts and zeal of such a combination.

"The Michigan State Board of Health evidently accept this truism in sanitary science and especially to their credit is the fact that they make it their rule of action. They have determined that this other half—the general populace—shall be converted into a strong and effective corps of sanitary aids. To effect this most desired aim they have planned and inaugurated with the judiciousness and energy which have distinguished them in the past, a campaign of education of the general populace in the essential principles of sanitation and preventive medicine. The chief means by which this campaign of education is prosecuted in Michigan are very simple, and should in the end prove to be very effective. They may be classified under two general heads: 1. The distribution of leaflets—embodying plain, concise information and instruction as to the cause, mode of spread, and best means of preventing the specific diseases—among the people in the locality where an outbreak occurs; 2. The requirement that school teachers shall at specified dates instruct their pupils, using figures, diagrams and so forth, as to the danger, mode of spread, best means of restriction and prevention of the most important epidemic and infectious diseases,—using as a basis of such instruction information furnished by the State Board of Health for that purpose.

"The particularly unique feature in this campaign of education, planned and pursued by the health authorities of Michigan, is that which we have briefly described under the second head. We are informed that the teachers of Michigan, as a rule, have not only willingly acquiesced in the requirements of the law of their State in this regard, but have recognized, even with some degree of enthusiasm, their widened relations and duties to the State through the instruction they must give concerning the limitation of preventable disease."

The text of the law is as follows:—

Act No. 146, Laws of 1895.

An Act to provide for teaching in the public schools, the modes by which the dangerous communicable diseases are spread and the best methods for the restriction and prevention of such diseases.

SECTION 1. *The People of the State of Michigan enact,* That there shall be taught in every year in every public school in Michigan the principal modes by which each of the dangerous communicable diseases is spread, and the best methods for the restriction and prevention of each such disease. The State Board of Health shall annually send to the public school superintendents and teachers throughout the State printed data and statements which shall enable them to comply with this act. School boards are hereby required to direct such superintendents and teachers to give oral and blackboard instruction, using the data and statements supplied by the State Board of Health.

SEC. 2. Neglect or refusal on the part of any superintendent or teacher to comply with the provisions of this law, shall be considered a sufficient cause for dismissal from the school by the school board. Any school board wilfully neglecting or refusing to comply with any of the provisions of this act, shall be subject to fine or forfeiture, the same as for neglect of any other duty pertaining to their office. This act shall apply to all schools in this State, including schools in cities or villages, whether incorporated under special charter or under the general laws.

The true end of all our labor as teachers is to produce, as far as we are able, true and noble characters The old saying, "A sound mind and a sound body" has been enlarged in our day and a trinity of essentials, body, mind and character, are recognized, having indispensable interdependence one upon the other. A truly noble character must be based, among other things, on a thoroughly disciplined mind, and in turn, the mind cannot be cultured to the best advantage except it be housed in a physical organism of the most perfect kind. Gymnasiums and gymnasium directors, field athletics and "coaches", class and intercollegiate contests, all are monuments to the recognition in our day of the necessity of well developed bodies for the pupils of our schools.

The subject of hygiene has long been taught in all our schools but somehow the modern methods of physical culture have had very little use for the theories such as have been taught under this somewhat ambiguous term. The practical matters of physical culture have been settled on other grounds. Athletics have their natural habit in the out-door air and the question of ventilation has taken care of itself; fashion and the boy's own natural inclination for little or no clothing while exercising have conspired in the settlement of that important hygienic consideration; in spite of the solemn warning of text-book and teacher against the errors of diet, eating too much and too fast too often and too late, the average American has calmly resigned himself to his *pro rata* share of suffering from the great American disease, dyspepsia, complacently congratulating himself that no one ever dies from that cause. Impure water, contaminated by the leachings from the receptacles of filth such as are to be found around the ordinary home, has been grossly misrepresented in these so-called treatises of hygiene. Men have practically and truthfully contended that they have been drinking such water all their lives and that they seem to thrive upon it. In fact the only real element of danger, which occasionally the water does contain, the bacillus of typhoid fever, has not even been mentioned in the books or formed a topic for the instruction of the teacher. What I am trying to say is that hygiene, as it has heretofore been taught, has largely been misdirected and unpractical. It did not touch the larger and more significant and vital facts and principles which have to do with the physical welfare of the race.

Before entering upon a discussion as to what constitutes these larger truths, let me say that I think there can be detected a considerable reaction against the methods of teaching which have been used in anatomy and physiology. Surely some knowledge of anatomy and physiology is the proper foundation of the lessons which qualify one to shun the dangers to life and health in his surroundings.

It is understood that anatomical teaching is carried forward always with the thought of its subserviency to physiology and this latter subject in turn is taught largely with reference to its practical relations to personal and public hygiene. On the other hand, every one will agree that since Darwin's time, great improvements in some particulars have been made both in the matter and method of teaching the subjects of anatomy and hygiene. How a bone grows, its laws of development, its progressive stages of growth, its evolution in a word, is vastly more valuable and more interesting to the pupils than the dry memorizing of the mere names of the two hundred or more bones which make up the human skeleton. We have learned that there is one *os inominatum*, and in these later days we have gone farther and decreed that in the teaching of these subjects there shall be many more of them which shall be nameless.

But what I refer to more particularly is a reaction against the dissection of animals and the minute study of the internal structure of the body. There are those who argue that the somewhat superficial knowledge which at the best is obtained by the pupil is not sufficient basis upon which a rational system of hygiene may be made to rest, and further that the effect upon the minds and sensibilities of the pupils is bad. This idea is voiced in the report of the committee of ten when they say that "It is, in the judgment of the Conference, not desirable to teach a great deal of anatomy to young children. Such instruction is likely to lead, in some instances at least, to morbid if not prurient curiosity that is productive of far more evil than the instruction is likely to counterbalance with good."

I certainly do not altogether sympathize with this idea. There is not only a large amount of informational value in the study of anatomy and physiology but disciplinary value as well, and it only requires an apt and skillful teacher to train the powers of observation and through these the judgment and reason. Comparative anatomy, the observation and comparison of organs, structures and physiological processes in the lower animals, will be found to be a most potent and, from the standpoint of the pupil, a most interesting adjunct to that investigation which has for its end a better understanding of the human body and the laws and principles by which it may be preserved to the highest degree of vigor and effectiveness.

For our present purpose, however, it does not matter whether there be less or more of dissection, less or more of the details of human anatomy and physiology, so that proper time and attention be bestowed on a line of facts and principles which have been almost entirely ignored.

The advice given by the conference of teachers to the committee of ten is good, but it does not go far enough. They say, "That hygiene adapted to the capacity of young children may be profitably given on the subjects of personal cleanliness, pure air, and the relation of the carriage of the body to healthy respiration, wholesome foods and moderateness and regularity in their use; regular and sufficient sleep; regularity in other bodily habits; care as to temperature, and prudence concerning exposure; and abstinence from narcotics and stimulants, and from drugs generally." But a more comprehensive view of the subject may be obtained and a more intelligent idea formed of what may be accomplished, by our teaching, by studying more thoroughly not only those causes which simply lead to temporary discomfort on the part of those who transgress the laws of diet, exercise, etc., but also those causes which have as their inevitable results, disease and death.

The leading causes of deaths have been most carefully studied by sanitarians and vital statisticians for the past twenty-five years, and while our laws regulating the registration of vital statistics are yet quite imperfect, still in a general way the history of the State in regard to mortality is well known and facts may be stated with something of mathematical accuracy.

From these statistics we learn that about one and three-fourths per cent of the entire population of the State die in the course of each year. This means an aggregate of over thirty-five thousand deaths per annum.

These deaths are classified by the present vital statistician into two groups, viz.: (a) deaths from disease and (b) deaths from violence. Class (a) is in turn subdivided into (1) specific infectious diseases, including smallpox, enteric fever, yellow fever, diphtheria and croup, scarlet fever, malarial fever, tuberculosis (in all forms), whooping-cough, influenza, pneumonia, cerebro-spinal meningitis, erysipelas, septicæmia, Asiatic cholera, dysentery, leprosy, glanders, actinomycosis, rabies, tetanus, possibly cancer, and all other diseases of which the chief etiological factor is one or more micro-organisms. (2) Local or organic diseases, such as are not due to a specific infection.

Of the causes here enumerated the sanitarian confines himself principally to the first class for it is the zymotic or specific infectious diseases which from their nature we may restrict and prevent. Referring again to the report of the vital statistician we find that twenty-five per cent of all deaths result from these germ diseases, or a total mortality of about nine thousand each year in our State. These figures need to be kept in mind as two other facts are advanced, namely, (1) being germ diseases they are largely communicable from person to person, from man to animals and from animals to man, and (2) their ravages may be restricted and their spread prevented by the methods at present well known to sanitarians. Please do not misunderstand the statement. It is not said that these diseases can be cured; it can not be said that for all these we know the specific micro-organism which is the real cause of the death, but rather the statement is that by methods already known to sanitarians these causes can largely be removed and death prevented. Another putting of the case might be that in the State of Michigan, each year, nine thousand persons die who ought not to die. The prevention of disease is of far more importance than its cure.

Allow me to present another set of figures, briefly, in order to further emphasize the importance of this subject. Named in the order of their prevalence, the seven diseases which cause most deaths in Michigan are: consumption, pneumonia, diphtheria, typhoid fever, scarlet fever, measles, whooping-cough, small-pox, and the mortality from these alone for the ten years, 1884 to 1893 inclusive, was: consumption, 21,402; pneumonia, 11,071; diphtheria, 10,048; typhoid fever, 5,908; scarlet fever, 3,198; measles, 1,767; whooping-cough, 1,459; small-pox, 29; total, 54,879; an average for each of the ten years of 5,487.9.

The extended enumeration of all the diseases which at present would be included under the head of Specific Contagious diseases, and which were given above in order to make completeness of statement, might give the impression that it is proposed that the children in our schools are to be instructed in all the mysteries of the etiology and pathology of pneumonia, cerebro-spinal meningitis, erysipelas, tetanus, etcetera. At the best we would extend the list to be studied only to the seven which are most largely concerned in producing sickness and death among us. And it will be noticed that what is proposed to teach the pupils of our schools does not include the medical study and diagnosis of even these seven. The diagnosis will be made by a competent physician and the work of restriction and prevention, which is included in the proposed teaching is all carried on after the nature, cause, mode of spread, period of incubation, duration of attack etc., are made known through that diagnosis.

Taking now a further step in our review of this subject, let it be urged that the means of prevention are so simple and easy of application that they can be appreciated by the ordinary school boy or girl and as well by the masses of people. Infection and contagion, isolation and disinfection, the prevention of communicable diseases, are no longer mysterious terms belonging to some mystical science, but are names of subjects entering into and affecting the health and life of every member of the human family, and not only this but they are facts which may be understood and acted upon by the common people, lay as well as professional men. The problem is to thoroughly enlist the active co-operation of all the people. As one has said, "No one can fully protect himself so long as others do not understand the subject and act accordingly. Therefore, the only way these most important causes of deaths can be most completely avoided by us, is by increasing the proportion of the people who know how to restrict and prevent them." One serious impediment to the onward progress of the cause of sanitary reform has been that it is generally thought no one is capable of appreciating in any sense the elements of this problem except those trained for the medical profession, the doctors. This idea widely prevails to-day, and, I have no doubt, is securely lodged in the thought of some who listen to me here. It is not true: Sanitary science, both in its principles and in its practice belong to the people. There are no practical elements in these problems which cannot be clearly understood and intelligently put into practice by all the people.

It is a fact that grown people are conservative and do not quickly enlist themselves in a new movement. Young people are much more susceptible to teaching and hence the plan is to make the strategic point in our compaign of education to be the minds of those who are now impressible but who soon will be the active and determining forces of society.

This, therefore, is the plea which we desire to make, viz.: That a somewhat radical change shall be made both in the matter and in the method of teaching of so-called hygiene or as I prefer to call it Sanitary science. Every child in our public school should be taught the facts concerning the germ theory of disease. He should be taught something of the manner of conducting investigations by which is ascertained the true relation which exists between a specific germ and a specific disease. In this there is no suggestion that the pupil shall be put through a course of bacteriology. That is not necessary, but enough of teaching should be had to beget within the mind of every pupil a confidence in the announcements of Sanitarians, which confidence is a necessary foundation for intelligent action.

Careful instruction should be given concerning the most commonly occuring diseases, small-pox, consumption, scarlet fever, measles, diphtheria, typhoid fever, whooping-cough, etc., the premonitory symptoms of these diseases, the specific cause, if that be known, the method of spread, the method of prevention, whether isolation or disinfection or both are to be practiced. The pupil should be taught what is meant by isolation and how disinfection is carried on in the sick room, the disinfection of the air, the food, clothing, hands and body of the nurse. They should have a keen appreciation of the measures the cautious physician will always take in the case of supposed or suspected communicable disease. The relations of health officer to the sick, to the physician in charge, the duties of the health officer, his powers under the law, and in fact all health laws should be studied in school. Scholars should be so taught that they will appreciate our vital statistics, the facts and proofs concerning the saving of life, etc., and profit by them.

I have thus tried to enforce the following points:—

(1) It is not proposed to introduce a new subject of study to the curriculum of our schools but rather to change the mode and deal with new subject matter in the teaching of an old topic.

(2) The new subject matter is so simple in its nature and contents that it can, with great profit, be introduced into even the lower grades of our schools.

(3) The results of such teaching are far reaching and filled with great benefits to the human race, whether these results are measured by the length of life to which man shall attain or by the measure of his maximum effective force during the period of his natural life.

Allow me to conclude this paper with the expression of a wish that the people of our State may be led to measure their strength in this new field of labor and that they may prosecute a successful warfare against the smallest but the most deadly foes of the human race until the time may come when the longevity of the race shall be lengthened to at least a hundred years, when that great white plague, consumption, shall be utterly destroyed, when all communicable diseases shall be restricted to the minimum of activity and thus man be left in the posession of his full and unrestricted powers of body and soul.

THE STATE BOARD OF HEALTH.—A FINGER ON THE PUBLIC PULSE, OF TWO AND A QUARTER MILLIONS OF PEOPLE.*

BY HENRY B. BAKER, A. M., M. D., SECRETARY STATE BOARD OF HEALTH.

Mr. President and Members of the Bay County Medical Society:—

A few days ago when your invitation to me to address you on this occasion was received, I was at a loss to know what should be the topic. Reflecting on that question, it has seemed probable that the invitation was given because I was formerly myself a member of the Bay County Medical Society, and particularly because while I was practicing here my associations were close with my friend, your honored Ex President—Dr. I. E. Randall. I have often recalled with pleasure the courteous and even cordial welcome which he extended to me when I came here, his courteous treatment of me while I remained, the good wishes he expressed for the success of the undertaking for which I left here, twenty-five years ago last autumn, and his many expressions of friendly interest in my work since that time. It has occured to me that perhaps he and others among you might be interested in a brief "account of my stewardship" and an outline of some of the public-health work in Michigan during the twenty-five years since I went out from among you to labor in what was then an untried effort for the public good.

The Michigan Board was not actually the first State Board of Health, the first report of the Massachusetts Board supplied the stimulus which led me early in the year 1870 to draft the bill for the establishment of a Board of Health for this State. But the plan for the work of this Board was not quite the same as the one on which the Massachusetts Board was at first established. The Michigan Board was, I believe, the first one entirely an advisory board, the main function of which is the collection and diffusion of information useful for the prevention of sickness and deaths, and the promotion of the most perfect health of the people of the State. That principle is now recognized as the most important one in the constitution of State Boards of Health. And nearly every State in the Union, and nearly every province in the Dominion of Canada, now has a State or a Provincial Board of Health, our nearest neighbor Ontario having been the first Canadian province to enter upon this work, which has since been followed by five other provinces.

The first bill for the establishment of a State Board of Health in Michigan was drawn here in this city (then Wenona) early in 1870. In June, 1870, the State Medical Society met in Lansing, and I went from here there to read a paper, and to advocate a State Board of Health. At that time the law provided that in compiling the Vital Statistics of Michigan, the Secretary of State should have the assistance of a committee from the State Medical Society or from the medical faculty of the University. Professor A. B. Palmer was chosen to represent the faculty, and as I was appointed by the State Medical Society, Prof. Palmer gave way for me, in order that I might the better labor for the establishment of a State Board of Health, which I continued to do, before and during the session of the legislature of 1871. But the movement was not then successful; therefore, instead of returning to my practice here as I had intended, I decided to continue the effort (by means of letters, newspaper articles, and otherwise) until the next session of the legislature, two years later, meantime compiling in the State Department the "Vital Statistics" the "Highway Laws," and the large octavo volume "Statistics of Michigan 1870" from data supplied by the U. S. Census of 1870.

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* An address to the Bay County Medical Society, February 10, 1896.

The legislature of 1873 passed the act creating a State Board of Health, and the Board entered upon its labors the last of July, 1873. Being young and hopeful, I then expected that the Board would at once be a strong, vigorous, and successful worker in every line of work it undertook for the public welfare, and that no person or corporation would want to do it injury. But, like the human infant which has to battle with the dangers of teething, whooping-cough, and many other dangers incident to childhood, so the State Board of Health found a few powerful corporations, and a few active persons, including a very few doctors who were prosecuted for not reporting dangerous diseases, all of whom together have been able to keep the Board from reaching the highest ideal goal.

Turning now from its struggles, let us consider some of its accomplished results, and prospective work.

Having, from the start and throughout its existence, the cordial support of the State Medical Society and of the leading physicians throughout the State, it was able at once to have a corps of medical correspondents whose observations and reports covered well nearly the entire State. It was therefore able to collect much valuable information, even before the general organization of the health service, under the laws. But, after getting into communication with the physicians of the State, one of its first systematic efforts was for the thorough organization of the public-health service of Michigan, so that whatever contagious disease afflicted any part of the State it should receive prompt attention and should be reported to the central office.

When the State Board was established there was no proper local health service in most of the cities, villages, and townships, not even in Detroit or Grand Rapids. Here in this village, while I lived here, one of the members of the council complained to me that a certain matter which should have the immediate attention of the board of health, was being neglected. He did not even know that as a member of the council he was himself a member of the local board of health, while I then had nothing whatever to do with the subject except to treat any person who might become sick through the neglect of which he complained. Now there is hardly a city, village, or township in Michigan that has not a board of health, and a health officer whose name is on file in the office of the State Board, and who is in more or less close communication with the office of the State Board. There are nearly sixteen hundred such local health officers.

One of the difficulties in the way of the best public-health service, which the State Board has labored hard to overcome, although there has been improvement in some places, has still to be labored with; that is, the insufficient compensation of local health officers. In Detroit it has been brought up to five thousand dollars per year; but in many places it is still ridiculously low. The medical profession would do the people a good service if they would use their influence to increase the compensation of local health officers generally. The office should be one of prominence, the incumbent of which the people would be likely to criticise if faithful and thorough work was not done. The people of Detroit paid no attention to their local health service until the salary of the health officer was raised to three thousand dollars, and much more is expected of him now that he has five thousand dollars per year. And a good health officer can save in money values to the people of Detroit much more than five thousand dollars per year, and at the same time lessen the burials in the graveyard. The same principle applies to the cities in Bay county. And throughout the county and the State the people would soon gain much if they could be induced to increase the compensation of their local health officials. And, as a stream cannot rise higher than its source, and as an army is no better than the bravery and other characteristics of its individual soldiers make it, so the work of a State Board of Health, which relies largely for its information, and for the execution of its views, upon local health officials, is aided and promoted by whatever adds thoroughness, promptness, and completeness to the work of local health officials.

Theoretically, under our laws, *the State Board of Health has its finger on the public pulse.* The law requires that every case of disease dangerous to the public health shall be reported by the householder or physician to the local health officer; and another law requires that the health officer shall report the same to the State Board of Health; one law says that the local health officer shall keep the Secretary of the State Board "constantly informed" on this subject. The restriction of damage by fire, by means of associated effort, in accordance with law, is well understood, and every one promptly notifies the fire department on the occurrence of a fire; but the people generally do not yet seem to understand *the great value of associated effort* for the restriction and prevention of diseases. A great part of the work of the State Board of Health has been the systematic effort to educate the people of this State along this line. That work is still in progress, and there will be need for it for many years; because the highest good of the people in this regard will not be reached until, as they now are in case of fire, they come to be generally as prompt to give notice and to make it possible to have the full power of the community, and the best advice the State can supply, brought to bear upon the restriction and prevention of every outbreak of disease which threatens the public health.

Such movements, however, gain momentum as they go forward; and last year we were able to make a most important advance in our methods of work, because of Act 146, Laws of 1895, which provides for teaching in every public school in Michigan the modes by which the dangerous communicable diseases are spread, and the best methods for the restriction and prevention of such diseases. Text-books on that subject are notably deficient, and knowledge is rapidly being accumulated so that a text-book up to date one year would soon be imperfect, therefore the law requires that the data shall be supplied to the teachers by the State Board of Health. If this law is thoroughly complied with, it is safe to say that it will not be many years before the people generally in Michigan will be thoroughly intelligent on this most important branch of knowledge.

But this sanitary teaching in the public schools was commenced only in 1895; during its first twenty-one years, the educational work of the State Board of Health was entirely by other means, which were probably the most effective possible for the adult people of Michigan. Most of you are probably familiar with the system, so I need now only briefly outline it.

Every case of a dangerous communicable disease is to be reported to the central office at Lansing. In every locality in which such a disease is reported present, the health officer is to be supplied by the State Board of Health with pamphlets telling just how the particular disease which is present in his locality may be stamped out. These pamphlets the health office to distribute or cause to be distributed to the neighbors of the premises in which the disease is. Coming at such a time, the pamphlets are quite generally read, and tend to create a sentiment in the neighborhood making it easier for the health officer to restrict the disease. As one result of this systematic work during the past twenty-two years, the general intelligence of the people on these subjects is far in advance of what it was before this work was entered upon. And the statistics indicate that, compared with the preceding time, there has been, during the years since this work has been in progress, a saving of persons from death, from three diseases alone, amounting to at least eleven hundred lives per year.

The political economist may reflect that the thousand, and more, persons whose lives have thus been saved have cost the people of the State, money to raise them from birth, and that the loss of those lives would have involved also a money loss equal to what they have subsequently been able to earn in excess of the cost of their maintenance. If this value of each one be considered about half what a first-class slave was worth "before the war," the value of the eleven hundred persons saved annually amounts to more than half a million dollars. Half a million dollars a year, and eleven hundred lives saved are good and sufficient reasons why it is important that the State Board of Health have its *finger on the public pulse* to the extent of receiving notice of every outbreak of a dangerous communicable disease, and for the continuance of that line of educational work for which those reports are essential.

To those of you who have not given this particular problem in social science much thought, it may not be at once apparent why the people could not be just as easily educated without as with the reporting of communicable diseases to the State Board of Health. The explanation is easy, it is because people cannot easily be taught on subjects in which they have *no interest*. When there is no danger of diphtheria they will not read pamphlets on the restriction of that disease. Experience has demonstrated that, when the danger is great they *will* read them. The *finger on the public pulse* is required, therefore, for the carrying on of that work, which can be done only by "striking while the iron is hot,"—distributing the information while the subject is interesting.

Another reason why the *finger on the public pulse* is important is because that system supplies the scientific foundation for the most valuable sickness statistics in the world. Michigan physicians can be assured, I think, that there are nowhere else in the world sickness statistics worthy for a moment to rank with those statistics which have resulted from the faithfully-reported experiences of the health officers and other leading physicians in Michigan during the last twenty years. Aside from Michigan, I know of no such area nor extensive population concerning which the exact course of every important disease in every month in the year is positively known; here we have that knowledge. Facts, too numerous to mention here, have thus been established, so far as relates to Michigan at least, and many of them have since been verified as probably true in other countries. The skeptic may ask of what use are statistics? Their uses are many and increasingly important. The subject is too important to be thoroughly discussed in this connection, but an instance or two may be mentioned by way of illustration. Take, for instance, the disease, typhoid fever, its exact course and proportional amount in every month in the year, having been established by the Michigan statistics, it has been possible to compare with that course, every condition thought likely to control the rise and fall of that disease, and to fix upon the probable controlling conditions, in this State. The proposition is self-evident that efforts for the prevention of diseases need not be expected to be successful unless based upon knowledge of their causation, including the controlling conditions in our surroundings. Sickness statistics supply such knowledge, and such statistics have enabled the Michigan State Board of Health to lead in many very important undertakings.

These are a few of the reasons why the State Board of Health has its finger on the public pulse, and why it should continue to receive from a reasonable number of physicians in active, general practice, in every part of the State, those weekly reports of all diseases which come under their personal observation.

As a rule, these reports have never been properly paid for. The people of the State of Michigan certainly, and I believe it will sometime be acknowledged that the people of the world, owe a great debt to the philanthropic physicians of Michigan who have made it possible for a State Board of Health to keep its finger on the public pulse and thereby to guide the public-health work of a great State; and at the same time have supplied scientific data which should be useful wherever, throughout the world, the conditions of the rise and fall of diseases are to be studied and controlled.

THE ETIOLOGY AND PATHOLOGY OF TYPHOID FEVER.*

BY HENRY B. BAKER, M. D.

ETIOLOGY.

The fact that, by request of a committee, this paper has been prepared to "open a discussion" on the etiology and pathology of typhoid fever, implies that neither of these two branches of the subject is settled. In connection with both branches, there are, however, very many facts which are more or less well established; so it must be one function of this paper to recall to our minds some of these facts, and, if possible, to do this in such order as shall suggest harmonious interpretations of the facts, to aid us in arriving at conclusions concerning the etiology and pathology of this important disease.

1. Filth as a Factor in the Causation of Typhoid Fever.

It seems to me that it is established that typhoid fever is a "filth disease," that is, that what we know as "filth" has had much to do in the causation of typhoid fever.

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*A paper read at the meeting of the Michigan State Medical Society, June 4, 1896.

The eminent Sanitarian, Dr. Joseph von Foder, compiled the facts relative to the surroundings of fatal cases of typhoid fever in Buda Pesth, Hungary, during fifteen years—1863–77, with results as follows:—*

Deaths from typhoid fever per hundred houses when the *interior of the dwelling* was:—

1. Very clean	165
2. Clean	177
3. Dirty	182
4. Very dirty	356

There was gradual increase from "very clean" to "dirty," and a very great increase from "dirty" to "very dirty." Compared with the "very clean," there were more than twice the proportion of deaths in the "very dirty" dwellings.

With the yards surrounding the houses, the result was as follows:—

Typhoid fever deaths per one hundred houses when the *yard* was:—

1. Very clean	159
2. Clean	186
3. Dirty	208
4. Very dirty	282

The evidence was conclusive that want of cleanliness outside the dwelling had great influence in the causation of typhoid fever, but not nearly as great as had want of cleanliness inside the dwelling.

Other evidence that filth is a factor in the causation of typhoid fever, is the experience in Munich before and since the filth of the city has been promptly carried out of the city by means of sewerage: Thus, in 1852–9 when the drinking water was from wells, and the human excreta was stored in overlying vaults, the mortality from typhoid fever was 24.2 per 10,000 inhabitants. In 1860 the vaults were required to be cemented; in 1860–7 the typhoid mortality was reduced to 16.6 per 10,000. In 1866–73 a system of sewers was commenced, involving the commencement of the use of a general water-supply; in 1868–75 the typhoid mortality fell to 12.7. The sewers were continued in 1874–80, in 1877–79 the typhoid mortality was reduced to 7.8. In 1881–4 the sewers were further continued, and a good spring water was added to the general water-supply; the typhoid mortality decreased, until in 1884 it was only 1.4 per 10,000 inhabitants.† The death rate from typhoid was then only about one seventeenth what it had been when Munich drank water into which human filth percolated.

This indicates the *nature of the filth* which seems to have causal relation to typhoid fever,—the excretions of human bodies. This evidence of the etiology is in harmony with some of the evidence of the pathology of the disease,—one approved name of the disease is "enteric fever"; an important effect of the disease is in the intestine; it is reasonable to suppose that the cause of the disease may be given off from that part of the body in which the pathological change occurs. Apparently this is true; the disease appears to be spread by a cause which goes from the intestine,‡ and is capable of producing the disease when it reaches the intestine of another person.

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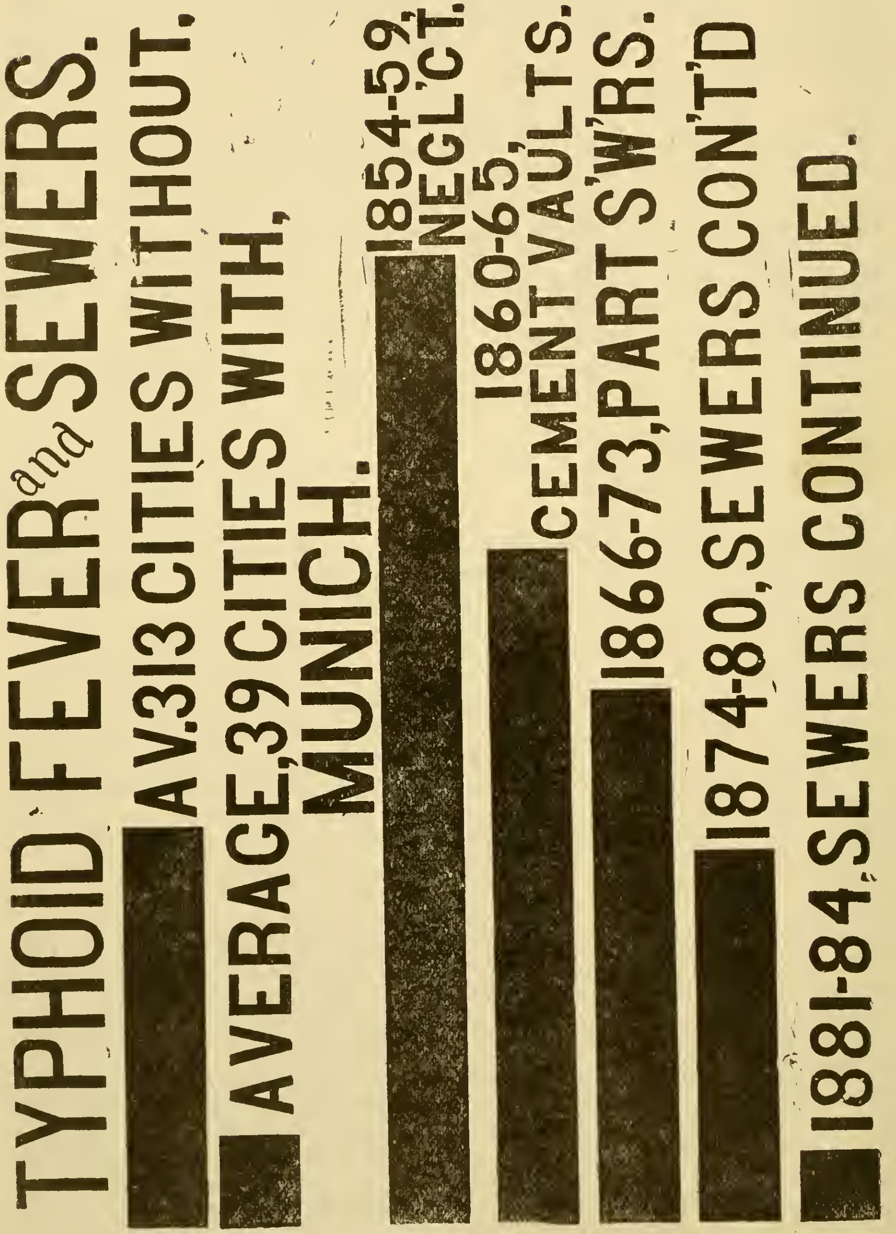
* Archiv für Hygiene Zweiter Band, 1884, Zeite 269, 272.

† This is graphically exhibited in the diagram, p. cxliv.

‡ Recent investigations make it probable that the urinary excreta also convey the germs of typhoid fever. Experiments by Wright and Semple, London Lancet July 27, 1895, page 196.


TYPHOID FEVER and SEWERS.
AV.313 CITIES WITHOUT.
AVERAGE,39 CITIES WITH.
MUNICH.
1854-59, NEGL'CT.
1860-65, CEMENT VAULTS.
1866-73, PART SW'RS.
1874-80, SEWERS CONT'D
1881-84, SEWERS CONTINUED.

[PLATE NO. 651.]

Typhoid Fever Among Plumbers.

In a report of the Board of Health of Montclair, New Jersey, mention was made of a plumber being attacked by typhoid fever in consequence of having made repairs in one or more of the houses in which the fever had occurred.* A similar case occurred under my observation in Lansing, Michigan, a few years ago.

Is the Cause a Chemical Poison, or is it Specific.

Many classes of facts seem to demonstrate that the cause of typhoid fever cannot be simply a non-living chemical poison not capable of reproduction, and that it must be an organized body capable of reproduction and continuous multiplication. For instance, as an illustration, from a house in Philadelphia in which there was typhoid fever, a man went to Plymouth, Pa., was taken sick with typhoid fever, his discharges were thrown out on the snow which melted and was washed into a small mountain stream which served as the source of a public water-supply. In a short time about a thousand persons who drank that water contracted typhoid fever, while many other persons in the same village who drank water from wells, the water from which when analyzed at the laboratory of the Michigan State Agricultural College was found to be very much more badly contaminated with leachings from human excreta, did not then contract typhoid fever; although, afterwards, when there had been opportunity for the privies to have been "infected" with typhoid discharges, the disease appeared, in some instances, to have been contracted from water in the underlying wells. In the mountain stream the dilution was such as to make it impossible that so many cases of fever could have been caused by any chemical poison; there must have been reproduction of the "infection" in the intestines of the patients. And the contaminated well water did not cause typhoid fever until after it became infected.

At Cumberland, Md., in 1889–90, the evidence is that typhoid fever was not present until the discharges from a *typhoid patient* living on one of the little streams which empties into the Potomac about 200 feet above the pumping station, found their way into the city water supply.† Dr. Kober, who has made a special study of the subject, says: "Such instances can be recited by the hundreds."† I am myself familiar with many such instances.

In a great many instances, notably the outbreak at Plymouth, Pa., the tendency of such evidence is to prove that typhoid fever is not caused by non-infected human excreta; but by excreta of typhoid fever patients.

This is equivalent to saying that typhoid fever is caused by a specific organism, or organisms.

The Practical Restriction of Typhoid Fever Proves its Communicability.

The lessening of typhoid fever by sewerage and improved water-supplies, shown in diagrams and charts I and II, submitted herewith,‡ is evidence that typhoid fever is communicable, and that it may be restricted by the measures mentioned.

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* Jour. Am Med Assoc., Vol. 23, page 691.

† Report of Dr. George M. Kober, in Annual Report Comm. Dist. of Columbia, 1895, page 259.

‡ Pages cxlvi-cxlvii

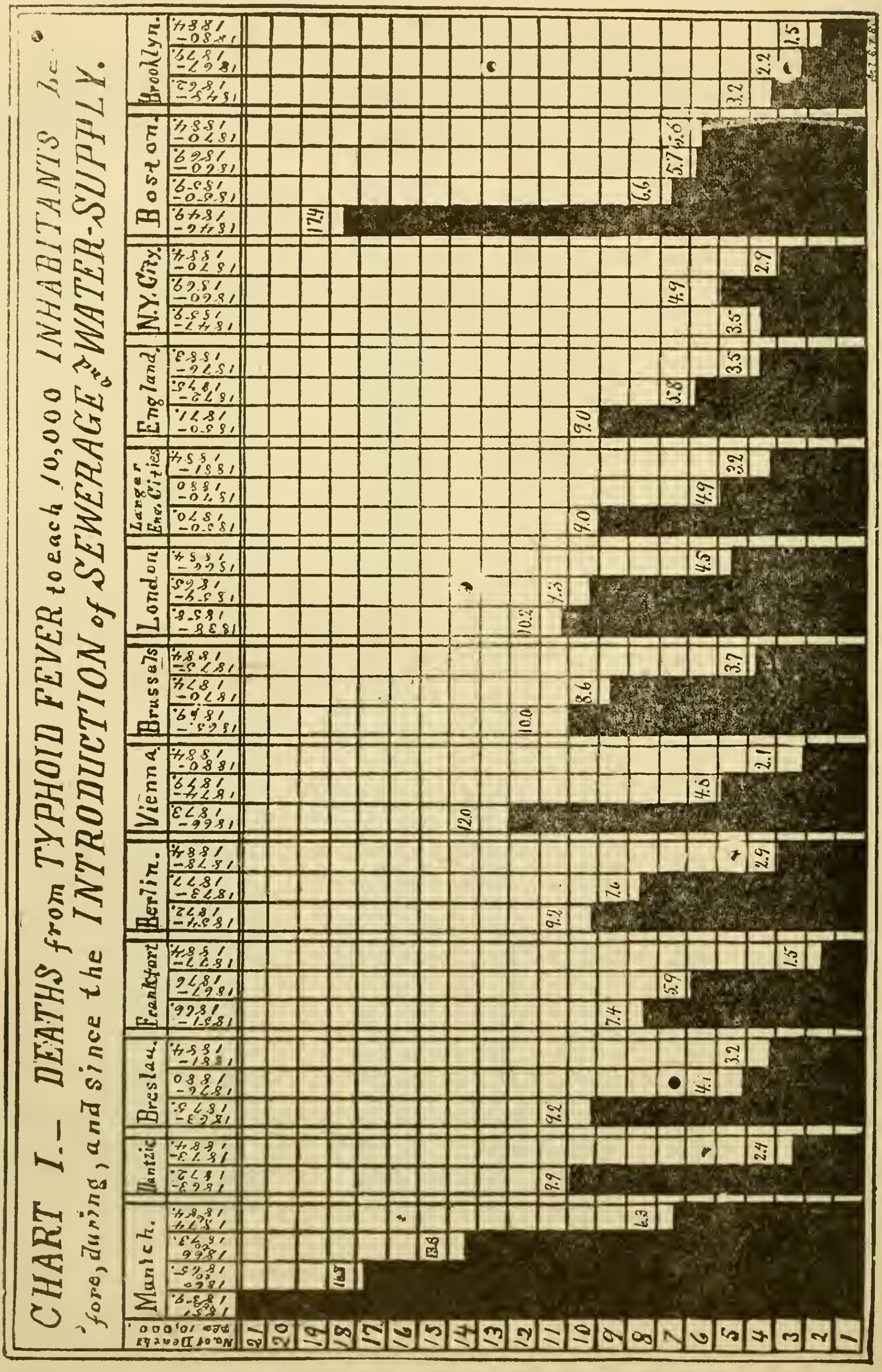


CHART I.— DEATHS from TYPHOID FEVER to each 10,000 INHABITANTS be-fore, during, and since the INTRODUCTION of SEWERAGE and WATER-SUPPLY.

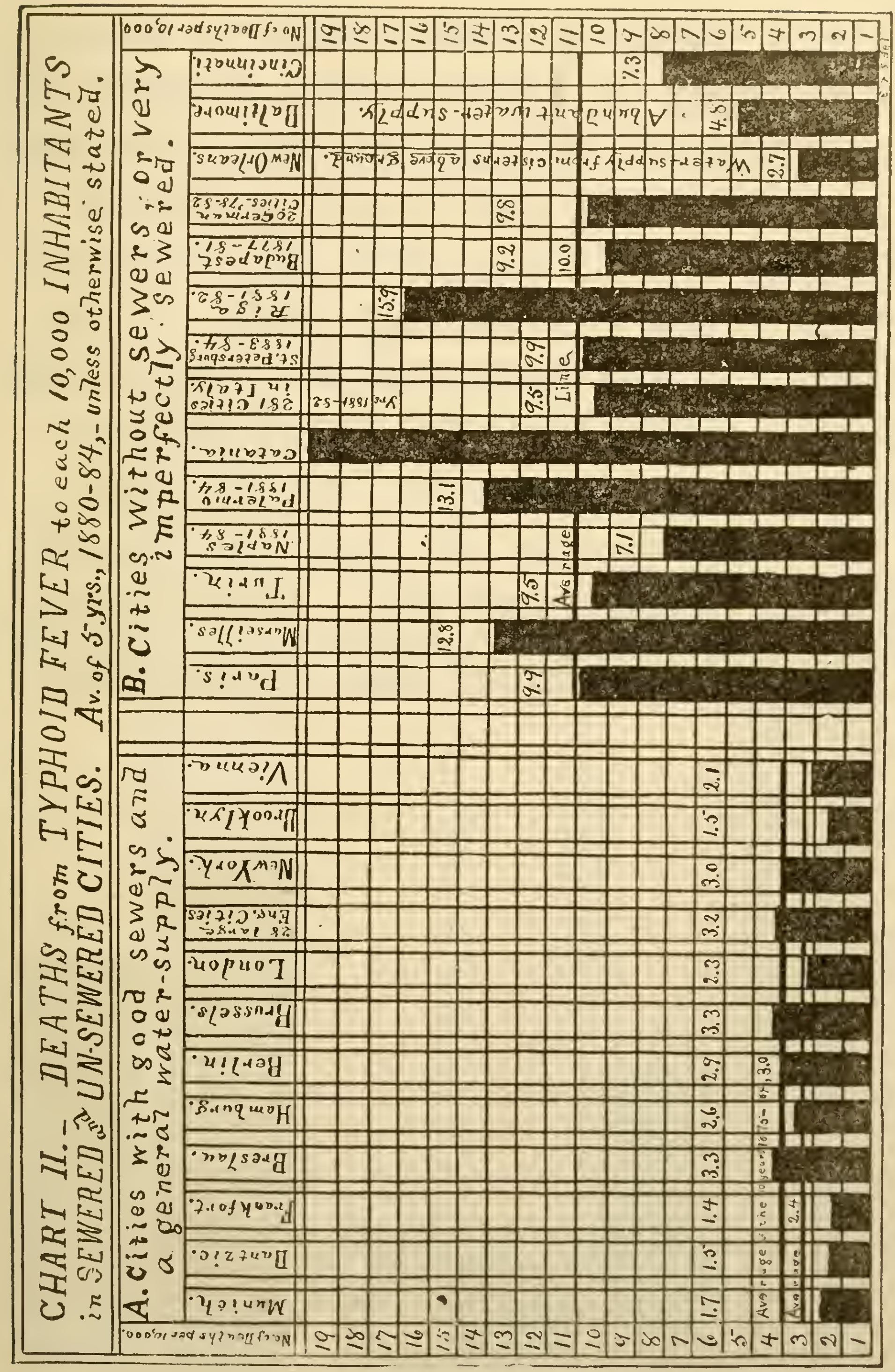
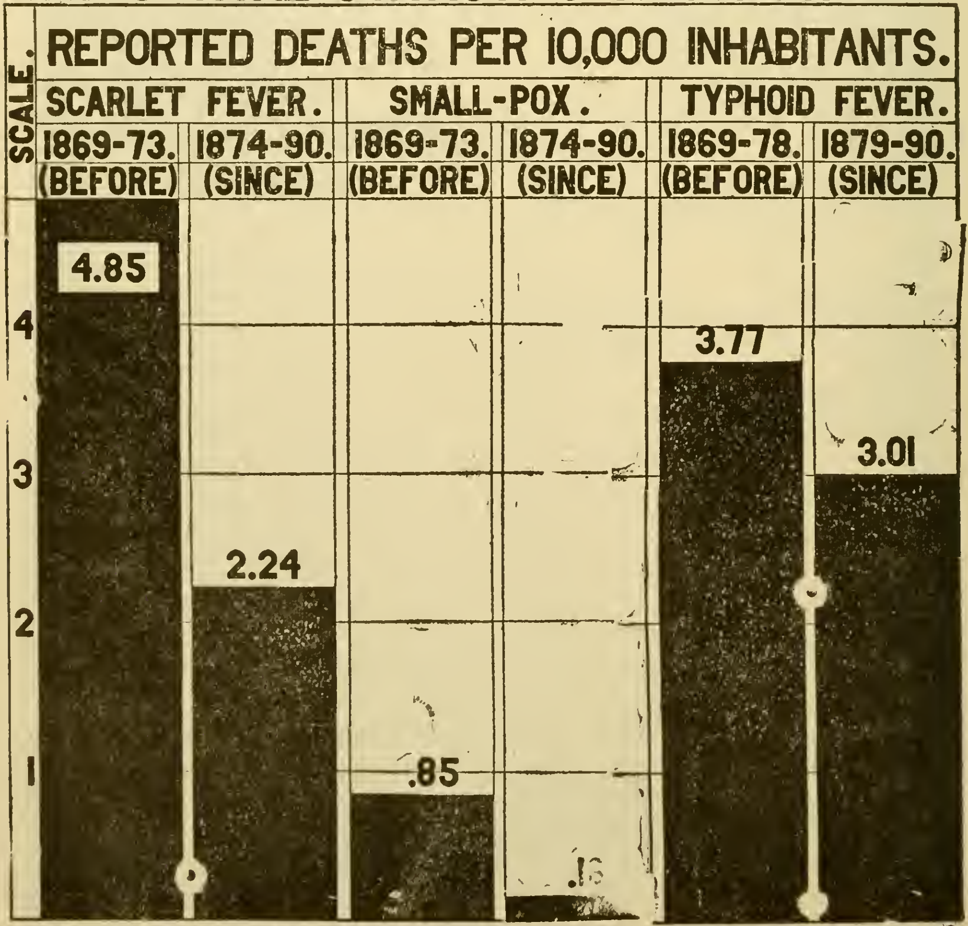


CHART II.– DEATHS from TYPHOID FEVER to each 10,000 INHABITANTS in SEWERED & UN-SEWERED CITIES. Av. of 5 yrs., 1880-84,– unless otherwise stated.
A. Cities with good sewers and a general water-supply.
B. Cities without sewers, or very imperfectly sewered.
No. of Deaths per 10,000
Munich.
Dantzic.
Frankfort.
Breslau.
Hamburg.
Berlin.
Brussels.
London.
28 large Eng. Cities
New York.
Brooklyn.
Vienna.
Paris.
Marseilles.
Turin.
Naples. 1881-84.
Palermo. 1881-84.
Catania.
281 Cities in Italy. Yrs. 1881-82
St. Petersburg 1883-84.
Riga. 1881-82.
Budapest. 1877-81.
20 German Cities. '78-82.
New Orleans.
Baltimore.
Cincinnati.
1.7
1.5
1.4
3.3
2.6
2.9
3.3
2.3
3.2
3.0
1.5
2.1
Average of the 14 years, 1875-84, 3.0
Average 2.4
9.9
12.8
9.5
7.1
13.1
9.5
9.9
15.9
10.0
9.2
9.8
2.7
4.8
7.3
Average Line
Water-supply from cisterns above ground.
Abundant water-supply.
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19

[PLATE 644.]

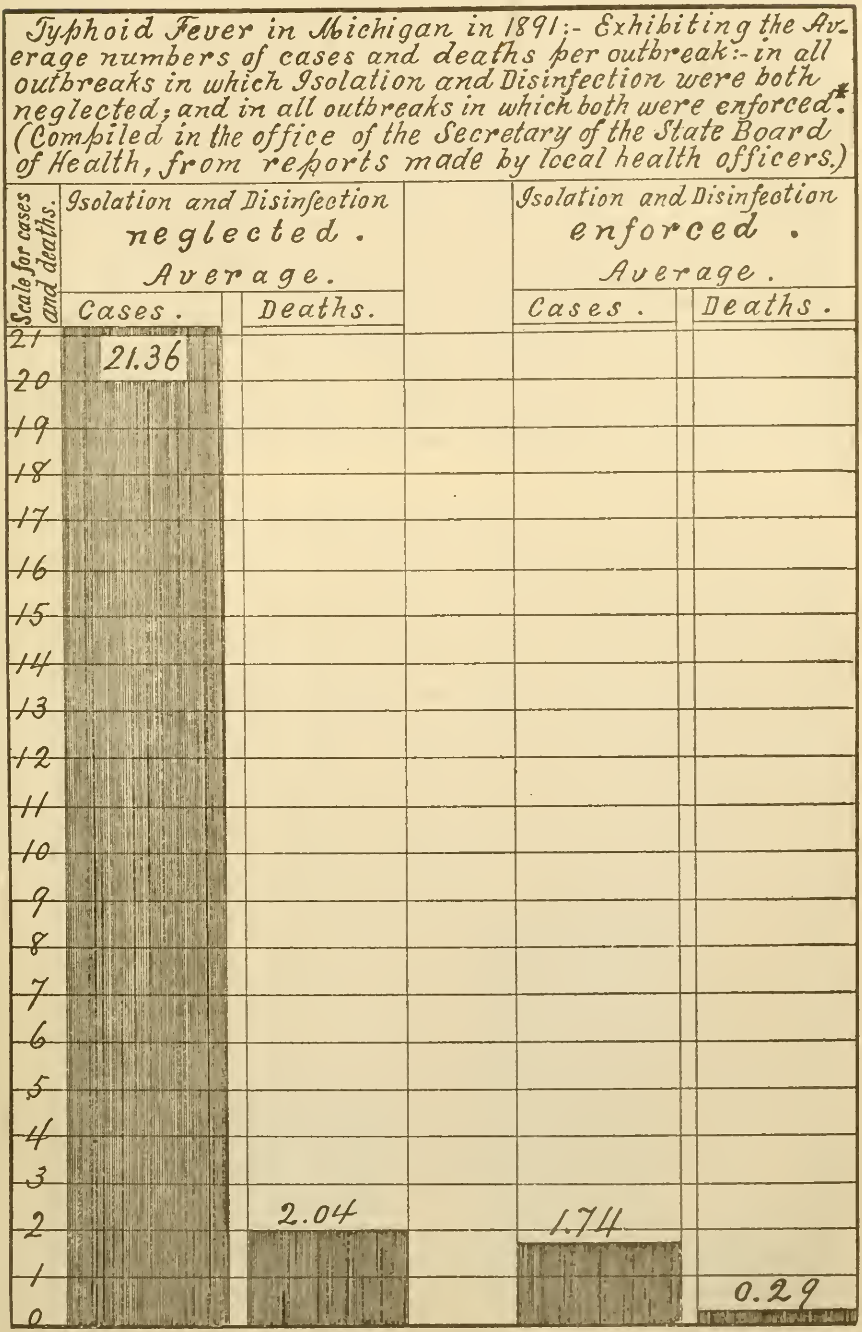
LIVES SAVED BY PUBLIC-HEALTH WORK. COMPARISON OF DEATH-RATES IN MICHIGAN FROM SCARLET FEVER AND SMALL-POX BEFORE AND SINCE THE STATE BOARD OF HEALTH WAS ESTABLISHED AND FROM TYPHOID FEVER BEFORE AND SINCE ITS RESTRICTION WAS UNDERTAKEN BY THE STATE BOARD. COMPILED FROM STATE DEPARTMENT'S "VITAL STATISTICS" OF MICHIGAN.



LIVES SAVED FROM: SCARLET FEVER (17 YEARS) 7,265; SMALL-POX (17 YEARS) 1,921; TYPHOID FEVER (12 YEARS) 1,671.

PLATE NO. 517.

Isolation and Disinfection Restrict Typhoid Fever.



Typhoid Fever in Michigan in 1891:- Exhibiting the Average numbers of cases and deaths per outbreak:- in all outbreaks in which Isolation and Disinfection were both neglected; and in all outbreaks in which both were enforced.* (Compiled in the office of the Secretary of the State Board of Health, from reports made by local health officers.)

*Including the disinfection of the bowel discharges of the patients.

A similar line of evidence is that in the diagram, entitled "Lives Saved by Public-Health Work,"* wherein it is shown that during those years in which the State Board of Health has been laboring for the restriction of typhoid fever the mortality has been less than it was before. That diagram relates to the entire State; if we confine the inquiry to local outbreaks, and separate them into two classes, as is done in the construction of the diagrams "Isolation and Disinfection Restrict Typhoid Fever,"† it is plain that isolation and disinfection restrict typhoid fever, which implies that it is a communicable disease. The disinfection includes that of the bowel discharges from the patient; and it should, by all means, have included that of everything in any way soiled by their urine which, in some instances, has been found to be almost a pure culture of the typhoid bacillus.‡

In the outbreaks studied, probably the urine, dried on linen, has been entirely overlooked as a cause of typhoid fever. But the evidence seems to be conclusive that in townships, villages, and small cities typhoid fever may be restricted so that only about two cases, and an average of one-fourth of one death shall occur to each outbreak. In the year 1891 a few epidemics greatly increased the average in localities where isolation and disinfection were neglected, but the results of isolation and disinfection were about the same as in the other years.

Typhoid Fever is a Communicable Disease Sometimes Waterborne.

It seems to me to be established that typhoid fever is a specific communicable disease. How is it communicated?

The facts relative to the lessening of typhoid fever in Munich, and facts of similar import in cities throughout the world, seem to demonstrate that the prompt removal of excreta by sewers, associated as that usually is with an uncontaminated water supply, decreases the *spread of typhoid fever.*

"The example of Dantzig, however, shows that an *abundant* water-supply alone does not diminish the death-rate. This city was supplied with water in 1869, and sewered in 1872. No marked diminution in the death-rate of typhoid fever occurred until after the introduction of the sewers. Washington, with a daily individual supply of 177 gallons, has an average annual mortality of 6.2, while New York, with 74 gallons per capita, has 3.1 deaths yearly to 10,000 population. *Abundance* of water alone, as might well be supposed, does not limit the spread of typhoid fever."§

In such cities as have sewerage but still have a contaminated water supply, typhoid fever still remains. Philadelphia is an example. Chicago has been a noted example. Cities like New Orleans where there have been imperfect sewerage, but a water supply from rain-water cisterns not much contaminated by human excreta, do not suffer much from typhoid fever.

Logically it seems to follow that the large part of the typhoid fever must be caused by the typhoid excreta in the drinking water.

There are on record specific instances too numerous to mention where typhoid fever epidemics and local outbreaks have been traced to the use of water infected with excreta of a typhoid fever patient.

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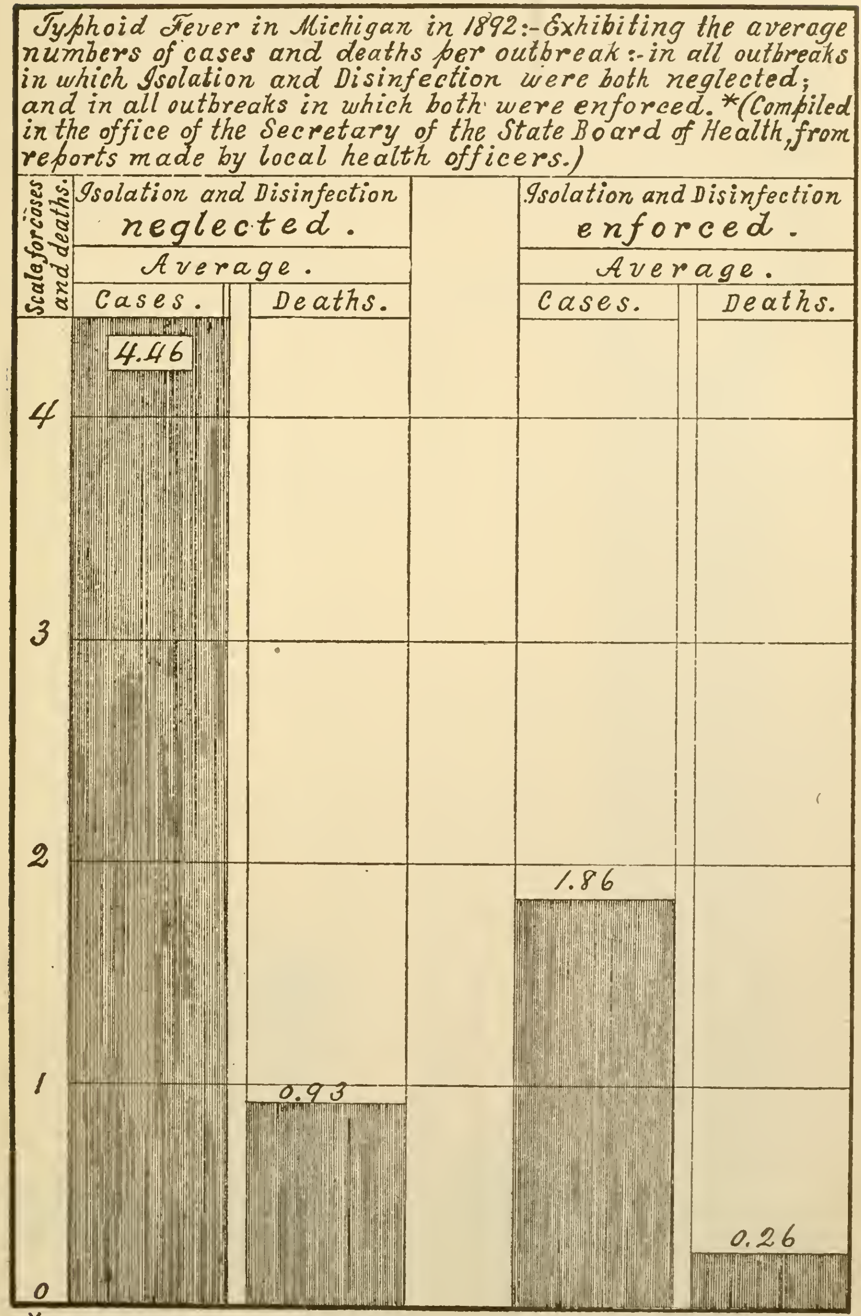
* Page cxlviii.

† Pages cxlix, cli and clii.

‡ Experiments made by Wright and Semple, London Lancet July 27, 1895, Vol. II, No. 4, page 196.

§ Report of Medical Society Dist. of Columbia, in Journal Am. Med. Assoc., Vol. 23, 1894, p. 82.

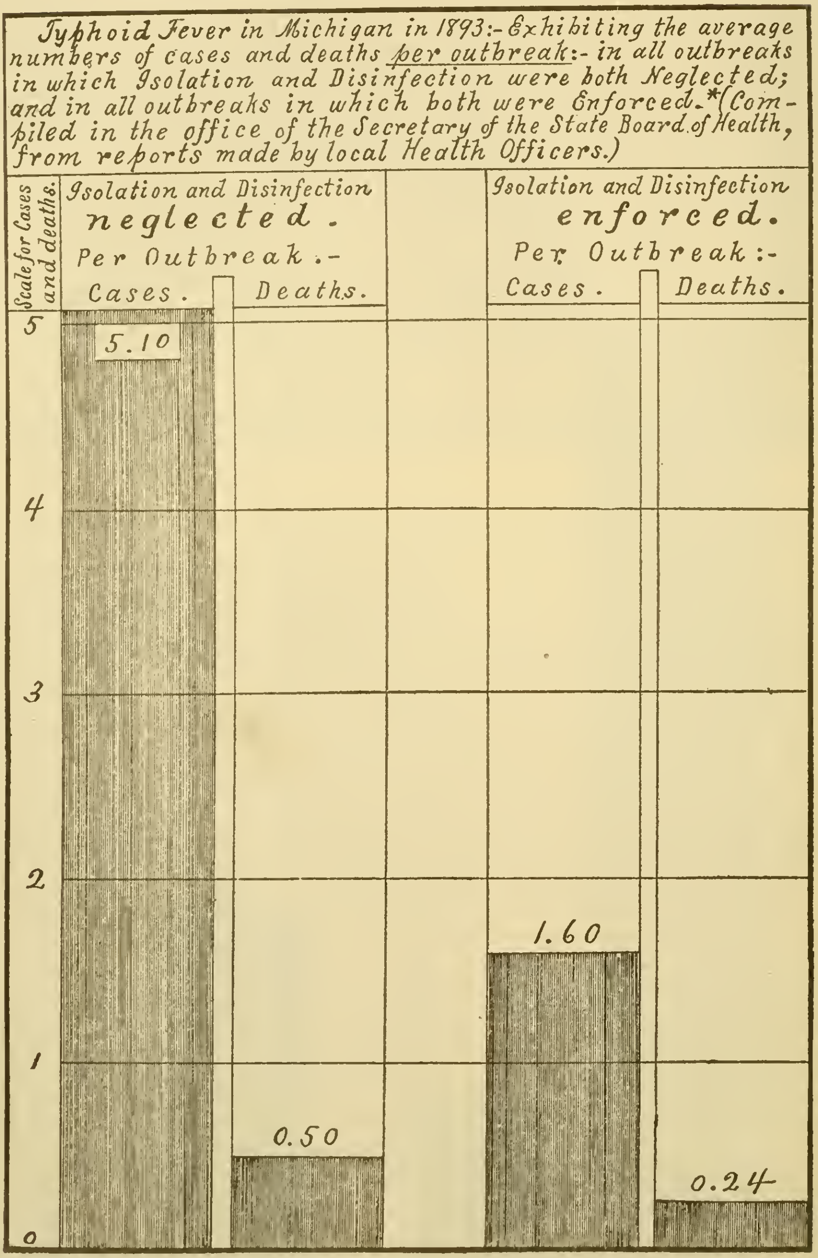
Isolation and Disinfection Restrict Typhoid Fever.



Typhoid Fever in Michigan in 1892:-Exhibiting the average numbers of cases and deaths per outbreak:-in all outbreaks in which Isolation and Disinfection were both neglected; and in all outbreaks in which both were enforced.*(Compiled in the office of the Secretary of the State Board of Health, from reports made by local health officers.)

* Including the disinfection of the bowel discharges of the patients.

Isolation and Disinfection Restrict Typhoid Fever.

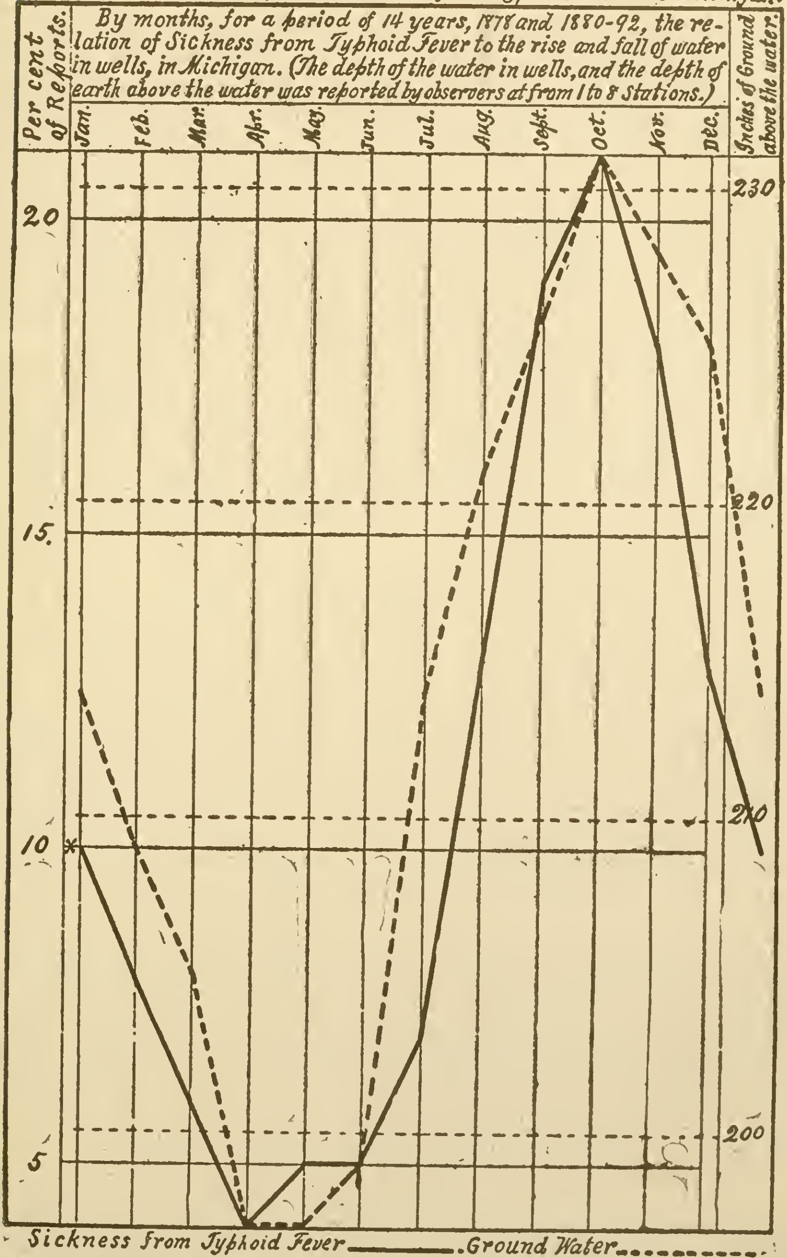


Typhoid Fever in Michigan in 1893:- Exhibiting the average numbers of cases and deaths per outbreak:- in all outbreaks in which Isolation and Disinfection were both Neglected; and in all outbreaks in which both were Enforced.*(Compiled in the office of the Secretary of the State Board of Health, from reports made by local Health Officers.)

*Including the disinfection of the bowel discharges of the patients.

[PLATE 780.]

Low Water in Wells, and Sickness from Typhoid Fever in Michigan.



* Indicating what per cent of all reports received stated the presence of Typhoid Fever then under the observation of the physicians reporting.

The danger from typhoid fever is greatest in October, when the water in wells is lowest, and least in April, when the water in wells is highest.*

[PLATE NO. 681.]

Low Water in Wells and Typhoid Fever.

The foregoing leads naturally to an interpretation of the facts concerning the very close relation of low water in wells to typhoid fever in localities dependent upon wells for the water-supply. Many years ago Dr. George E. Ranney, then Secretary, and later President of this Society, called attention to an increase in typhoid fever at a time of low water in wells. Dr. Foster Pratt, also an Ex-President of this Society, spoke, in June, 1874, of a similar circumstance under his observation. With a view of studying the subject systematically, about 20 years ago, I induced regular observations and records of the depth of water in wells in Michigan; five or six years later I tabulated the results, and found a very striking relation. Herewith is a diagram (Plate No. 681)* exhibiting the facts for 14 years, 1878 and 1880–92. It is plain that the relation is very nearly quantitative. The lower the water the more typhoid fever.

Prof. Max von Pettenkofer was the first to make a systematic study of this subject, and he established the fact of a very close relation of typhoid fever and ground water in Munich.† His interpretation of the fact, however, was not that the disease was caused by drinking in the germs with the infected water, as was my belief; but that it was caused by breathing typhoid germ-laden air forced out of the ground by fluctuations of atmospheric pressure. This cannot be the true explanation of the facts in Michigan, because my tables and diagrams show that the average daily range of atmospheric pressure does not sustain such relations to typhoid fever as to make this possible; the range of pressure is at its minimum in July and its maximum in January, while typhoid fever has its minimum in April and May, and its maximum in October; and a curve representing its increase and decrease shows no influence of the atmospheric pressure.

On the other hand, the drinking-water interpretation takes account of the fact that in times of low ground water a well *in use* drains a wider area, and is therefore more liable than in times of high ground water to be infected by leachings from more privies at a distance. Again, it takes account of the fact that any infection which may reach the well will be much more diluted when the ground water is high than when it is low; the chances of contracting typhoid fever are, therefore, greater when the water is low.

There is another interpretation which may be true under some circumstances, not, however, so universal as the drinking-water explanation, but which may contribute toward the same result. When the ground water is low the surface of the earth will generally be dry. Human excreta on the surface of the earth or in shallow receptacles will, more generally than when the ground water is high, be in a condition to permit the wind to detach any typhoid germs which may be on its surface or which may be trampled into dust, and to float them off, to infect air, food or drink, or to be washed from roofs of buildings into the rain-water cistern.

Typhoid Fever Spread by Milk.

Mr. Ernest Hart has collected and tabulated facts relative to 50 outbreaks of typhoid fever spread by milk.

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* Page cliii.

† "Boden and Grundwasser," etc., by Pettenkofer, Munich, 1869

In the report of the health officer of the District of Columbia for 1895.* Mr. Hart's tabulation is included with 88 other outbreaks collected by Drs. Busey and Kober; altogether there are tabulated the details of date, place, number of cases, deaths, circumstances of outbreak, reporter, and reference to publication, relative to one hundred and thirty-eight outbreaks of typhoid fever in different parts of the world, believed to have been caused by infected milk. (The table, with additions collected by myself, is submitted as an appendix to this paper.)

Many of the outbreaks caused by infected milk were traced further back to infected water, used, in 54 instances for washing the cans and utensils. In 14 instances the intentional dilution of the milk with polluted water is admitted. In six instances the infection is attributed to the cows drinking or wading in sewage-polluted water thus infecting the udder, and finally the milk. In three instances the infection was spread in ice cream prepared in infected premises. In 21 instances the dairy employees also acted as nurses.† In outbreak No. 1 reported by Dr. Taylor, in Edinburg Med. Jour., May, 1858, "the outbreak, which affected 7 families, was traced to a supply derived from a milk-man in whose cottage were cases of typhoid fever. The milk was kept in the kitchen, where the children lay, and the mother, who was the nurse, also milked the cows."*

In a few instances water seemed to have no part in the spread of the disease.

Typhoid Fever Spread by Oysters.

Uncooked oysters "fattened" in typhoid-infected waters are now known to be a means of spreading typhoid fever. An outbreak due to this cause, at Wesleyan University, Middletown, Conn., in October, 1894, was thoroughly investigated, and the results published in the report of the Connecticut State Board of Health for 1894.‡ Two cases of typhoid fever, the discharges from which went through a private sewer into the Quinnipiac River near where the oysters were placed in fresh water to "fatten,"—absorb fresh water—just before they were to be used, were the source and cause of the outbreak. Twenty-three students and six other persons who attended the banquet, contracted the disease.

The general subject of typhoid bacteriology and oysters in salt and fresh waters, at ordinary temperatures, was afterwards investigated by Charles J. Foote, Demonstrator of Bacteriology in Yale University.§ "Many bacilli were found in the oyster juice and in the stomach of the oyster a month after infection, from which it appears that typhoid bacilli may live even longer in the oyster than in the water which surrounds it, from which they usually disappear within three weeks when new infection does not occur."¶

Typhoid Fever Spread by Infected Clothing.

Dr. Kober in the report of the health officer of the District of Columbia, for 1895, page 259, summarizes a report by Gelau as follows: "A German artillery regiment, with an average mean strength of 353 men, between the years 1873 and 1884 furnished not less than 146 cases of typhoid fever.

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* Pages 346-364.
† Page 330.
‡ Report by H. W. Conn. Professor of Biology, Wesleyan University, pp. 243-264.
§ Med. News, Mar. 23, 1895.
¶ Modern Medicine, Feb., 1896, p. 40.

The water-supply was above suspicion, disinfection of the quarters and even abandonment of the barracks failed to check the disease. This finally led to the suspicion that the clothing might be the source of infection, especially as the garments were promiscuously worn. Examination revealed the presence of fecal spots in a number of pantaloons. The clothing was now disinfected, after which only three mild cases appeared, and these were confined to the men engaged in disinfection."

Typhoid Fever Spread Through the Air.

In several instances brought to my notice but not published, typhoid fever has, apparently, been contracted by taking the specific cause into the mouth with the air inhaled. In two such instances the nurses who contracted the disease *slept* in the same room with their patients. Bearing in mind the frequency with which a sleeping person breathes through the mouth, and the fact that then the normal protection of the nose with its moist hairs, disinfecting saline mucus, constantly flowing downward to be evaporated and imprison incoming dust and germs, one may realize the greater liability of a sleeping person to contract typhoid fever. In the Southern States it has many times been observed that yellow fever is much more often contracted by *sleeping* in an infected locality than by visiting it in the daytime.

While investigating an outbreak of typhoid fever in the State Prison at Jackson, I contracted typhoid fever notwithstanding I took no food or water while there. The outbreak occurred soon after a new prisoner had come into the prison, and the disease was apparently spread in more ways than one, but not through the drinking water. A wooden bucket in each cell every night was emptied every morning, and an attempt made to disinfect it by rinsing it with a disinfecting solution; but inspection led me to think that the disinfection was not complete, so it is possible that some of the cases were caused by emanations from an infected bucket, because no effort was made to have the same bucket go to the same cell every night. Among the first persons about the prison to contract typhoid fever, was the guard who was stationed on top of the wall immediately over the place where the buckets were each morning emptied into the sewer, then rinsed and placed in rows to be dried and aired during the day. The typhoid patients were put in the hospital on the fourth floor of the central building, and their dejecta went into a soil-pipe in which there was a break, or from which air could pass through a "dead-end" to a sewer under the lowest floor.

In cells along a line between this source of sewer air and a very large ventilator at the other end of the room, prisoners contracted typhoid fever, so there was reason to believe that the disease was spread through the air from the soil-pipe, on its way to the ventilator. To answer the question whether this was possible, because it was known that micro-organisms are not given off to the air from moist surfaces, a bottle was sterilized, filled with sterilized water, the bottle held in the "dead-end" to the sewer, the water allowed to run out, and the bottle to fill with air from the sewer. While this was being done, the soil-pipe from the hospital on the fourth floor was flushed, foul air rushed out but no fluid or solid came near the bottle. Meantime, with other members of the State Board of Health, I was standing near in conversation with the Warden of the Prison. The bottle was taken by Prof. Vaughan to the laboratory at the University, and I understand that Prof. Vaughan found the bacillus of Eberth or at least a pathogenic bacillus in its interior. Soon after my return home, I was mildly sick for nearly three weeks, with unmistakable typhoid fever, contracted apparently through the atmosphere.

A few years ago, there was typhoid fever in Iron Mountain, Michigan, and it was especially noticeable to Dr. Anderson, then in that city, that there were most fever cases in houses the rear ends of which were on the three sides of a sort of court in which were numerous foul privies which in wet times drained into a foul pond near the center of the court, but which in a dry time permitted their overflowed contents to be trampled by those who passed through into dust to be blown about by the winds. One windy day, I inspected the locality, and it was easy to understand that if the specific cause of typhoid fever had been deposited in any one of the privies, its dissemination by the wind would be almost certain, because the germ is not rapidly destroyed by drying.

What is the Specific Cause of Typhoid Fever?

Dr. George M. Kober, of Washington, D. C., in a recent report on the subject, after giving different views of the specific cause, has said: "All scientific physicians agree, however, upon one point, viz., that typhoid fever is caused by an organized germ capable of reproducing itself within and without the body."*

Just here, however, is where we arrive at a point in the etiology where differences of opinion exist; for, while a majority of the prominent bacteriologists conclude that the Bacillus typhosus demonstrated in typhoid cadavers by Eberth in 1880, and obtained in pure cultures by Gaffky in 1884, is the sole and only cause of typhoid fever, there are those who regard this as, to say the least, "not proven." Thus, the last edition of "Ptomains and Leucomains" by Vaughan and Novy, says: "In this belief Vaughan refuses to concur, and claims that the Eberth bacillus as found in the spleen after death is an involution-form of any one of a number of germs which are found in certain waters. Vaughan claims that the typhoid bacilli can be detected in drinking-water by the following characteristics: (1) They grow at 37°, while many of the non-pathogenic germs of water grow only at lower temperatures. (2) They are pathogenic to rats, guinea-pigs, mice, and rabbits. (3) They do not coagulate milk. (4) When grown in milk or gelatin colored blue with litmus, the color is not altered."†

THE PATHOLOGY OF TYPHOID FEVER.

A recent writer has stated that the pathology of typhoid fever has long been known, but the etiology has only recently been discovered. In this paper I shall endeavor to omit so much of the pathology as has very long been known, and devote all the time I am permitted to use to the consideration of a few points in pathology which are comparatively new. And, to my mind, there are a number of important facts in pathology which have not very long been known; facts which could not be fully appreciated until considerable progress had been made in the etiology of the disease. For instance, the significance of abscesses, in various parts of the body, could not be appreciated until the bacteriologists had investigated the pus in those abscesses, and found there the apparent specific cause of typhoid fever. A new light is thrown on the pathology of typhoid fever by the knowledge that the specific germ has been found in the blood, and in nearly every organ and tissue of the body. This supports the view that typhoid fever is a disease of general blood infection. New light is supplied by the knowledge that the life-processes of the germs produce a poison, the effects of which, in various parts of the body, are important. Thus "Sanarelli's prolonged studies upon experimental typhoid fever lead him to maintain that the intestinal disturbances in this disease are due to the toxin, and not to the local action of the typhoid bacteria."*

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* Report of Health Officer of the District of Columbia, 1895, p. 257.

† Edition 1896, page 208.

"Agro (Annales de Micrographie, vi., 1894) has discovered the very interesting fact that the mixture of the cultures of bacilli coli and bacillus typhi abdominalis has greater toxic power than a similar quantity of either in pure culture."†

"In 1889 Vaughan isolated from mixed cultures from typhoid stools a base, forming crystalline salts and capable of inducing in cats and dogs a marked elevation of temperature accompanied by severe purging."*

"In 1890 Vaughan reported the isolation, from water supposed to cause typhoid fever, of a number of toxicogenic germs. The chemic products of two of these have been studied. They belong to the proteids, and an analysis of one of them by FREER shows it to belong to the nucleins."‡

In a paper read at the meeting of the American Medical Association at Baltimore, in 1895, William B. Noyes, M. D., of New York, after stating the proportions of children in each of numerous epidemics in Europe and in this country, says: "In conclusion, we would once more emphasize that typhoid in early infancy in a typical form is rare in this country, though not uncommon abroad. It is in a mild or abortive form that we much look for it here, if we wish to separate it from other intestinal or meningeal diseases that may appear."

Dr. Noyes says:—

"The pathologic changes in the infantile cases, while distinct, are much less severe than in adults. It is a very interesting fact that in a series of animal inoculations with typhoid bacilli by Santerelli (*Annals de L'Institute Pasteur, 1892-1894*) the changes in the intestine and other viscera were almost identical with those we have just described in children. These experiments consisted of a series of inoculations of rabbits, guinea pigs, white mice and monkeys with pure cultures of the Eberth bacillus, and were followed by a second series of experiments of inoculations with sterilized filtered products of the Eberth bacillus. The results were similar in the two cases. Swollen hyperemic spleen, congested intestine, diarrheal intestinal contents, infiltrated and congested Peyer's patches, red and hypertrophied solitary follicles. Hardened microscopic sections of the intestine showed a change in the epithelial lining, especially, and detachment of masses of epithelial cells together, such as occurs in a poisoning by arsenic or other corrosive drugs. Enormous infiltration of Peyer's patches occurred, abundant accumulation of lymphoid cells in and around the follicles and invading the submucous spaces. This change was not a simple hypertrophy of lymphatic plaques, but a condition just short of a beginning purulent infiltration. No typhoid bacilli could be found in these Peyer's patches in the animal, but enormous numbers were seen in the adjacent lymphatic glands and in the connective tissue of the mesentery. From these experiments, Santerelli comes to the conclusion that typhoid fever produced in animals is by preference an infection of the lymphatic system, and the toxin produced by the Eberth bacillus causes the anatomic lesions. These changes occur in all mucous surfaces and we should expect to find in both animals and in man, lesions in the mucous membrane of the mouth, larynx, bronchi and stomach with resulting symptoms which occur very frequently. Typhoid fever can no more truly be called a disease of the intestine than small-pox of the skin, though both have their characteristic lesions in those places."—*Jour. Amer. Med. Assoc. Vol. 25, Sept. 28, 1895, pp. 530-31.*

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* Jour. Amer. Med. Assoc., Vol. 23, Dec 22, 1894, p. 933.
† Jour. Amer. Med. Assoc., Vol. 23, Dec. 22, 1894, p. 934-935.
‡ Ptomains and Leucomains. 1896, p. 209.

> "Stern (*Volkmann's Sammlung klinischer Vorträge, No. 138*) has published another suggestive paper on typhoid." * * * "The question as to the presence of typhoid bacilli in the blood was tested in six cases, with positive results in three; twice in blood from roseolæ and once in blood from a vein. In the negative cases the blood was examined only once in two of the three cases. In the third case, confirmed by autopsy, three examinations were negative. In the cases with positive results the number of colonies was always small, as has been found by other investigators. The bacilli were found between the ninth and twenty-fifth days of the disease. The question whether the blood from the spots or that from the veins is most favorable requires further investigation."[*]

Otitis in Typhoid Fever.

The hearing is often affected in typhoid fever. "Botkin states as the results of observation in twenty-six cases, that he found in all but five an acute and bilateral inflammation of the outer ear."[†]

"*Peri-articular Abscess due to the Typhoid Bacillus.*

"Swiezynsky (*Centralblatt für Bakteriologie und Parasitenkunde*, Band xvi., No. 19, p. 775) has reported the case of a man, 18 years old, with the following sequence of an attack of typhoid fever of considerable severity: swelling and pain appeared in the right arm, followed by redness, tenderness, and fluctuation about the shoulder-joint, although this itself was not involved. In the course of a little while an abscess formed beneath the right deltoid, and an incision evacuated a quantity of pus mixed with blood." * * * "Bacteriologic investigation of the pus evacuated from the abscess about the joint disclosed the presence of typhoid bacilli exclusively."[‡]

Pylephlebitis and Abscess of the Liver Following Typhoid Fever.

"Lannois has recently described pylephlebitis and abscess of the liver following typhoid, in which the bacillus of Eberth was present in the pus from the abscess, though not in pure culture."[§]

Intrauterine Infection with Typhoid.

"Freund and Levy (*Berliner klinische Wochenschrift*, 1895, No. 25) report the case of a multigravida who was admitted to the hospital in the eighth day of typhoid, being five months pregnant. She progressed favorably until the fourth week, the temperature being but slightly elevated. Without apparent cause she expelled a living fœtus, which soon perished. Her temperature rose during labor, but fell immediately afterwards. The fœtus and placenta were received in sterile glass vessels, and an examination made of the spleen, blood of the heart, and placenta twenty minutes after birth. No gross lesions were found. Typhoid bacilli developed, however, after incubation." * * *

"The case is a remarkable demonstration of the direct passage of infection from mother to child, without anatomical lesions."[||]

Suppurative Parotitis Caused by the Typhoid Bacillus.

"To the list of suppurative processes complicating typhoid fever, in which the typhoid bacillus alone has been found as the cause of the abscess formation, Janowski,[*] has recently (in 1895) added a case of suppurative parotitis."[†]

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[*] Amer. Jour. Med. Sci., Vol. 111, March, 1896, pp. 349-350.
[†] Jour. Amer. Med. Assoc., April 5, 1896, p. 694.
[‡] Amer. Jour. Med. Sci , Vol. 109, 1895, p. 328.
[§] Amer. Jour. Med. Sci., Vol. 111, March, 1896, p. 347.
[||] Amer. Jour. Medical Sci , Vol. 110, Oct., 1895, pp. 488-489.

"The patient, a young man, had been sick in the hospital seven weeks, during which time he had greatly emaciated; had had more or less fever, and toward the last had developed hemorrhagic nephritis and a tender enlargement of the right parotid gland. The diagnosis of typhoid fever was first made on the autopsy-table, Peyer's patches showing distinct appearances of recently-healed ulceration. The right parotid gland was found to be infiltrated with pus, which was in places collected in small abscesses. Cultures from this pus developed only the typhoid bacillus, whose idenity was carefully proved with comparison of known cultures of the typhoid bacillus and of the *bacillus coli communis*."[‡]

In a paper read at the meeting of the American Medical Association in 1889, Professor Vaughan, in speaking of the Eberth bacillus, said:—"Gaffky and others found it always present in the mesenteric glands and spleen, often in the liver, and not so frequently in the kidney. In the intestine it has been found in the early stages in the swollen follicles and plaques and in the deeper layers, before there is any necrosis; but with the advent of ulceration there is found secondary invasion. But in addition to these organs, the Eberth germ has been reported by Chantemesse and Vidal in the lungs of typhoid patients with bronchitis, broncho-pneumonia, and pneumonia. The same observers report the germ in the brain, Curschmann in the spinal cord, Zenker and Hoffmann in the voluntary muscles and in the marrow of the bones, and Reher, Neuhauss and Chantemesse and Vidal in the placenta of typhoid patients. In twenty samples of blood taken from the finger, during life, of typhoid patients, Meisels reports the finding of this germ in nineteen. Neuhauss examined the blood taken from the eruptive spots in typhoid fever with success. Maraglinao and others examine the blood taken from the spleen during life as a means of diagnosis." * * * "Granting that these observers have not been mistaken in the nature of the germ which they have found, we must admit that the Eberth germ is widely distributed."[§]

In the same paper Dr. Vaughan says: "To sum up the evidence which we have found on this point we may say: (1) The Eberth germ is found invariably in the bodies of those dead from typhoid fever. (2) It has been isolated and grown in pure cultures. (3) All attempts to induce typhoid fever in the lower animals by inoculation with this germ have so far been without success. (4) Experiments show not only that the germs fail to multiply in the lower animals, but that when introduced by inoculation it soon died. * * * But the bacteriologist stops here and says: 'The lower animals do not have typhoid fever, and we must not conclude from the failure to induce this disease in them with Eberth's germ that this bacillus is not the true cause of typhoid fever.' 'If we could experiment upon man,' says he, 'I have no doubt that we could be successful.'"[¶]

Because the chemical products of the Eberth bacillus had not been demonstrated to be capable of producing the characteristic symptoms and lesions of typhoid fever, Dr. Vaughan then said: "We certainly cannot say that the Eberth germ has been demonstrated to be the true and sufficient cause of typhoid fever."[‖]

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[*] Cenralblatt f. Bakt. u Parasitenkunde, 1895, XVII., No. 22,875.

[†] Am. Jour. Med Sciences, October, 1895, page 501.

[‡] Am. Jour. Med. Sciences, October, 1895, page 501.

[§] Jour. Amer. Med. Assoc., Vol 13, 1889, pp. 831-32.

[¶] Jour. Amer Med. Assoc , Vol 13, 1889, pages 832-33.

[‖] Jour. Amer. Med Assoc., Dec. 14. 1889, page 833.

But in that same address Dr. Vaughan gave details of the inoculation of several dogs with a pure culture of germs resembling the Eberth bacillus, and in several instances the pathological results resembled those of typhoid fever in man. Dr. Vaughan said: "Notwithstanding the marked resemblance of our cultures to those of the Eberth germ, I must conclude from the effects obtained that we either had a wholly different organism or an impure culture."* Other investigators believe that typhoid fever is due to a mixed infection.

Typhoid Bacilli in the Urine; Typhoid Fever a General Blood Infection.

One of the most important ideas, however, is the view set forth by Drs. Wright and Semple, professor and assistant professor of pathology in the British Army Medical School at Netley, based partly upon their experiments on the infectivity of the urine in typhoid fever, which had been previously pointed out by Sanarelli working under the auspices of Metschnikoff, but on which fact Drs. Wright and Semple build up still further Sanarelli's new theory on the pathology of typhoid fever. Drs. Wright and Semple found the typhoid bacillus in the urine of six out of seven cases of typhoid fever. "In some cases the urine, even before incubation, is absolutely turbid with typhoid bacilli."†

They say:‡

> "The theory of typhoid fever, which is currently held and currently acted upon, is the theory that typhoid fever is an 'intoxication process' much in the same way as cholera is an 'intoxication process. In other words it is assumed that the typhoid bacillus vegetates in the intestine, that it effects a lodgment in the intestinal walls and that the poisons which are elaborated by the bacelli are absorbed into the system from the intestine. The systemic disturbance which characterizes typhoid fever is attributed to this absorption. This theory of typhoid fever is brought into harmony with notorious bacteriological facts by the assumption that there is a certain leakage of typhoid bacilli from the intestine into the system. This leakage theory is supposed to dispose of the fact that typhoid bacilli are invariably found in the spleen and mesenteric glands of patients suffering with typhoid fever. Now, this 'intoxication' theory of typhoid fever was originally based upon the fact that a bacillus which is morphologically indistinguishable from the typhoid bacillus is found in large quantities in the stools in every case of typhoid fever. Subsequent investigation, however, showed that this bacillus which predominates in the intestinal floor in cases of typhoid fever can be distinguished from the true typhoid fever bacillus by a series of chemical differences. The bacillus which is found in large quantities in the stools of patients suffering from typhoid fever is therefore not the true typhoid bacillus. It is the bacillus which is known by the name of 'Bacillus coli communis.' Recent research has therefore been directed to the question as to whether, in addition to the bacillus coli communis, the true typhoid bacillus is not also to be found in the stools of patients suffering from typhoid fever. The following are the results of careful examination of this question: The true type of typhoid bacillus was detected in the stools of only four of the twelve cases of typhoid fever which were studied by Wathelet. In the case of these four patients the typhoid bacillus was detected only four times in a total of twenty-four examinations and even on these four occasions the true typhoid bacillus was outnumbered by the bacillus coli communis in the proportion of about three to one. In the case of the other eight cases of typhoid fever the bacillus appeared to be absent from the stools throughout the whole course of the disease. Wathelet has further shown that if the bacillus typhosus and the bacillus coli communis are implanted into one and the same tube of nutrient broth the bacillus coli communis will outgrow and kill off the typhoid fever bacillus even when at the outset an enormous numerical preponderance is given to the typhoid bacillus over the bacillus coli communis. Again, Wathelet has shown that whereas the bacillus coli communis will flourish in a nutrient medium containing the toxins elaborated by the typhoid fever bacillus, the typhoid fever bacillus will not grow in a nutrient medium containing the toxins elaborated by the bacillus coli communis. If this holds true in every case, and it has seemed

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* Journal Amer. Med. Assoc., Dec. 14, 1889. page 834.
† London Lancet, July-Dec., 1895, page 199.
‡ London Lancet, July-Dec., 1895, pages 196-9.

to hold true in the few test experiments we have performed, we are evidently in a position to infer on *a priori* grounds that typhoid fever bacilli will be absent from the intestine whenever, as in the case of typhoid fever, we have to deal with the multiplication of the bacillus coli communis in the intestine. Both *a priori* reasons and actual observations therefore point to the absence of typhoid fever bacilli from the intestinal tract, and therefore the symptoms of typhoid fever cannot be interpreted as a result of the absorption of typhoid toxins from the intestine. They seem to ignore the poison of the bacillus coli communis. We are therefore compelled to seek for a new theory for typhoid fever, and if typhoid fever is not the result of an intestinal intoxication process we must evidently seek to explain it as a result of blood infection. This is, if we understand it aright, the theory of typhoid fever which has recently been put forward by Sanarelli, under the auspices of Metchnikoff. We have to see whether typhoid fever can be explained upon the basis of this theory. And evidently the first thing to be explained in the case of typhoid fever is the turgidity of the spleen and the presence of the typhoid bacilli in the splenic tissue. Now, this turgidity of spleen and this presence of micro-organisms in the splenic tissue is an invariable accompaniment of every septicæmic process. We find it in the case of such blood infections as anthrax in cattle and spirillum fever and malaria in man. And we have the explanation of this phenomenon in the experiments of Werigo which show that the introduction of any foreign particulate matter into the blood invariably results in a deposition of that particulate matter in the spleen (and other internal organs), and in an aggregation of polynuclear white blood corpuscles around the foreign particulate matter, and finally in a process of phagocytosis. Every body who has a rabbit and a little carmine, or any bacterial culture at his disposal, can readily verify these facts for himself. The enlarged spleen and the presence of bacteria there are thus quite in harmony with the theory of a blood infection in typhoid fever. The fact that the white blood corpuscles are diminished* in the circulating blood in typhoid fever is also in harmony with this explanation. We have further in connection with typhoid fever to account for the eruption of pink spots on the skin. These were inexplicable on the intoxication theory of typhoid fever. They are, however, of the easiest explanation if we make the assumption that typhoid fever is characterized by a blood infection, for here, as in other cases, we may instance the skin eruption in the case of human glanders; the spots evidently correspond to lodgments of the bacteria in the capillaries of the skin. This interpretation of the skin eruption has been borne out in the case of typhoid fever just as it has in the case of glanders by the fact that the specific bacteria have been cultivated from the spots. We have been able to confirm this observation in one of the cases of typhoid fever reported below.

"The intestinal symptons of typhoid fever are of somewhat uncertain explanation. Possibly they are to be explained as Sanerelli explains them, as a specific effect of the typhoid fever toxin on the adenoid tissue of the intestine, and of the subsequent invasion of that tissue by the bacillus coli communis" * * * "The occasional presence of typhoid bacilli in the intestine is easily accounted for by assuming that a certain number of the typhoid fever bacilli escape through the intestinal wall into the intestinal contents.

"In addition to the points which have just been touched upon, we may refer to other points which, although they have been comparatively neglected, throw an important light upon the pathological processes which are associated with typhoid fever. The phenomena in point are the presence of so-called 'miliary lymphomata' in the kidney and the presence of the typhoid bacilli in the urine. We have no recent opportunity of studying the miliary lymphomata which are described as occurring in typhoid fever, but they are probably quite comparable to the miliary lymphomata which are described as occurring in the spleen in cases of spirillum fever, and to the miliary lymphomata which are produced by the injection of fairly resistant bacteria, such as tubercle bacteria into the blood. Such lymphomata correspond to aggregations of the white blood corpuscles around bacteria which have lodged in the capillaries. They are a repetition in small of the aggregations of phagocytic white blood corpuscles which are seen on a far larger scale in the spleen. Lastly, in regard to the presence of typhoid fever bacilli in the urine. Even if typhoid fever bacilli were found in the urine only in occasional cases their presence there would be a strong argument in favor of the theory of a blood infection and against the intestinal intoxication theory. But the argument in favor of the septicaemic theory of typhoid fever becomes irresistible if it can be shown that the typhoid fever bacilli are almost always found in the urine in cases of typhoid fever. With a view of ascertaining this point we have examined the urine in the following typical cases of typhoid fever."

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*"It may be pointed out incidentally here that the paucity of white blood corpuscles in the blood probably stands in some connection with the fact that epistaxis is of frequent occurrence in typhoid fever. This epistaxis, if we may judge from a great many observations which one of us has made of the condition of the blood-coagulability, is almost certainly an indication of a diminished blood-coagulability such as can be obtained by the injection of particulate matter into the blood. In an experiment made by one of us the coagulation time of a dog's blood in the standard capillary tube was reduced from three minutes to fifteen minutes by an intra-vascular injection of carmine particles.

The Journal of the American Medical Association summarizes the conclusions of Drs. Wright and Semple as follows:*

"1. It is true that the typhoid bacilli are present in the urine of patients suffering from typhoid fever, and if, as we shall see, typhoid bacilli are generally absent from the feces, it will be evident that it is the urine, and not the feces of patients suffering from typhoid fever which is responsible for the spread of typhoid infection.

"2. If typhoid bacilli are constantly present in the urine of typhoid patients it may be possible to diagnose the presence or absence of typhoid fever by undertaking a bacteriologic examination of the urine.

"3. If it is true that typhoid bacilli are constantly present in the urine in cases of typhoid fever while they are generally absent from the feces, it will be evident that the conception of typhoid fever upon which the ordinary clinician proceeds is an entirely erroneous one.

"4. The working hypothesis regarding this fever in the minds of medical men generally, favoring as it does the notion that this fever is an intestinal intoxication process, should be revised, and substituted for it one that will have regard to the wide range of pathologic appearances, some of which at least fit in well with a hypothesis of blood infection, such as malarial fever in man and anthrax in cattle."

While most of the views expressed by Drs. Wright and Semple seem to me to accord with the facts, a few important discrepancies are noticeable,

(1.) From several lines of evidence it is apparent that the infection of the body by typhoid fever is primarily by way of the alimentary canal: therefore, the "assumption that there is a certain leakage of typhoid bacilli from the intestine into the system" appears to be true in fact. This, however, does not negative their assumption that later there may be a "leakage" from the general circulation and the tissues into the intestine.

(2.) Inasmuch as the common bacillus of the colon is increased in typhoid fever, and in its life processes produces a poison which when mixed with the product of the typhoid bacillus has increased toxic power,† intestinal antiseptics in typhoid fever may yet be important, notwithstanding the contrary suggestion of Drs. Wright and Semple, so that, although we may come to rely upon the poison of the bacillus coli communis to destroy the typhoid germs, instead of substituting for the intestinal intoxication theory, there may be added to that doctrine the idea of general blood and systemic infection, which seems to be well established by the independent observations of a very great number of investigators.

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* Jour. Amer. Med. Assoc., Oct. 5, 1895, p. 589.

† Agro, Annales de Micrographie, vi, 1894: Jour. Amer. Med. Assoc, Vol. 23, pp. 934-935, Dec. 22, 1894.

APPENDIX.

NOTE.—In this appendix, 171 outbreaks of typhoid fever believed to be due to contaminated milk are grouped. The first 49, collected by Ernest Hart, and the succeeding 89, collected by Drs. Busey and Kober, are taken from the appendix of the Report of the Health Officer of the District of Columbia for 1895. The succeeding 9 were collected by Henry B. Baker, M. D., Secretary of the Mich. State Board of Health. The remaining 24 were collected by Dr. Rowland Godfrey Freeman, and published in his pamphlet, "Milk as an Agency in the Conveyance of Disease." In his pamphlet, however, Dr. Freeman cites 53 outbreaks, 29 of which are previously mentioned in this appendix as collected by Drs. Busey and Kober.

Epidemics of Milk-Typhoid. (Hart.)

No.	Date.	Place.	No. of cases.	No. of deaths.	No. of cases among milk consumers.	Per cent.	Circumstances of the outbreak.	Reporter and reference.
1	Oct. and Nov., 1857	Penrith	------	----	------	----	The outbreak, which affected 7 families, was traced to a supply derived from a milkman in whose cottage were cases of typhoid fever. The milk was kept in the kitchen, where the children lay, and the mother, who was the nurse, also milked the cows.	Dr. M. W. Taylor, Edin. Med. Jour., May, 1858; Brit. Med. Jour., Vol. II, 1870, p. 623.
2	July and Aug , 1870	Islington (part of)	175	30	175	100	No evidence of typhoid fever at the premises; there was an underground water tank at the milk shop, communicating by means of rat burrows with two old drains, possible overflow of sewage from these into the tank, from which the water was used to wash the milk cans.	Dr. E. Ballard, M. O. H., Brit. Med. Jour., Vol. II, 1870, p. 589. Med. Times and Gazette, Vol. II, 1870, p. 611.
3	July and Aug., 1872	Armley, near Leeds	107	11	------	----	Traced to a milk farm where typhoid occurred in May, dejecta suspected to have been thrown on dung pit; in the latter part of the patient's illness copious rains fell and probably washed the germs from the pit or polluted soil into the well, as about this time the cause of the fever began to operate among consumers of milk.	Dr. E. Ballard, M. O. H., Reports Medical Officer of privy council and local government board, Vol. II, 1874, p. 79.
4	Oct. and Nov., 1872	Leeds	93	14	80	86	Typhoid fever at milk farm since September. Water supply pure, sick room communicated with kitchen and dairy, and the air of these premises common. Kitchen drain communicated with manure heap, and the privy, which received typhoid excreta, was overflowing.	Dr. M. K. Robinson, M. O. H., Brit. Med. Jour., Vol. I, 1873, p. 68.

5	Nov. and Dec., 1872	Moseley and Balsall Heath.	96	10	------	----	A case of what was no doubt typhoid fever occurred in a house located between two milk sellers; dejecta thrown into the privy from which the virus must have found access to the water of the milk sellers' wells. One of them polluted the milk, the other made no profession of selling it pure.	Dr. E. Ballard, M. O. H., Report Medical Officer local government board, No. II, 1874, p. 92. Brit. Med. Jour., Vol. I, 1873, p. 68.
6	Jan., 1873	Parkhead, Glasgow	39	6	46	86	Typhoid fever at dairy among the children in December. Milkers also nursed the affected children.	Dr. J. B. Russell, M. O. H., Glasgow Med. Jour.
7	April, 1873	Chester	15	----	15	100	Cases of fever at the milk shop in the latter part of 1872. A grocery and provision shop used also as a milk house.	Dr. E. Waters.
8	July and Aug., 1873	Marylebone and adjoining districts.	244	26	218	89	Occupant of milk farm died June 8 of ambulant typhoid fever; dejecta buried in an ash heap, the soakings from which must have found access to the well used for dairy purposes.	Dr. J. N. Radcliffe and W. H Power, Report Medical Officer local govt. board, No. II, 1874, pp. 103-136; Brit. Med. Jour., Vol. II, 1873, pp. 206, 207, 296.
9	July, 1873, to Nov., 1877	Ascot	69	----	58	84	No case of typhoid occurred at the milk farm till August, 1876, when the epidemic had lasted for three years. Contagion originally reached farm probably through the water entering the well in the yard, carrying the germ from elsewhere, after which the water used for washing milk utensils had an opportunity of specific pollution at the farm.	Dr. E. Ballard, Brit. Med. Jour., Vol. I, 1880, p. 83; Report Med. Officer local government board for 1877, p. 39.
10	August, 1873	Brighouse, Yorkshire	68	8	65	95	No typhoid fever at milk farm or dairy; cows healthy, but drank from a cess pool. Complaints of milk smelling badly and becoming offensive after standing awhile.	Dr. T. Britton, M. O. H., Brit. Med. Jour., Vol. II, 1873, pp. 267 and 334.
11	August, 1873	Wolverhampton	63	14	------	----	Two children of dairyman sick with typhoid fever in August. Well within a few inches of an old flat-bottomed brick sewer. Epidemic stayed by cutting off the supply of pump water by this milkman.	Dr. J. H. Love, M.O. H., Brit. Med. Jour., Vol. II, 1873, pp. 267, 290, 334, 447.
12	May and June, 1874	Brierly Lane	65	4	50	76	First person attacked was the dairyman. Wife nursed him and milked the cows. The dairy well upon analysis was found 'little better than filtered sewage.' No evidence, however, of specific pollution.	Dr. R. T. Thorne, Brit. Medical Jour., Vol. II. 1874, p. 391; Sanitary Record, Vol. I, 1874, p. 214.
13	June, 1874	Taunton	5	----	5	100	No evidence of typhoid fever at the source of milk supply. Well water of the dairy subject to "fearful contamination with the sewage."	Dr. H. J. Alvord, M. O. H.
14	August, 1874	Queensbury	36	1	34	94	Farmer's wife sickened of typhoid during outbreak. Well close to house; drain roughly made of stone. Earth between drain and well saturated with sewage.	Ann. Report of Med. Officer of Health for 1874.

Epidemics of Milk-Typhoid. (*Hart.*)—CONTINUED.

No.	Date.	Place.	No. of cases.	No of deaths.	No. of cases among milk consumers.	Per cent.	Circumstances of the outbreak.	Reporter and reference.
15	Oct. and v. 1874	Dundee	19	4	19	100	Typhoid fever cases at farm; 4 patients occupied a bedroom adjoining the milk store. Well water reported to be contaminated with the products of decomposing organic matter of the nature of sewage.	Dr. G. C. Pirie, M. O. H., Brit. Med. Jour., Vol. I, 1875, p. 225.
16	Feb. and Mar., 1875	Crosshill, Renfrewshire.	153				Two of the farm children had suffered from the disease; dejecta thrown either in the manure heap or into the ditch. Nurses also connected with the collection and disposal of the milk. Well water quite impure.	Drs. H. D. Littlejohn and E. Duncan, Brit. Med. Jour., Vol. I, 1875, p. 391. Sanitary Record, Vol. II, 1875, p. 61.
17	August, 1875	Jarrow	34	2	31	91	Six of the farmer's family, including himself, found ill with typhoid. Direct communication between dairy and sick room. Dairy also used as a wash house. The daughter acted as nurse and milkmaid.	Dr. John Spear, M. O. H., Brit. Med. Jour., Vol. II, 1875, p. 372. Sanitary Record, Vol. III, 1875, p. 195.
18	September, 1875	Glasgow [1]	[2] 59	3	58	98	Two cases of typhoid at farm. Washing for patients done on August 3, 10, and 27, in a wash house closely situated near pump well. Water quite impure.	Dr. J. B. Russell, M. O. H., Brit. Med. Jour., Vol. II, 1875, p. 535.
19	September, 1875	Glasgow [3]	121	3	98	81	Traced to same milk supply as epidemic No. 18	Do.
20	Jan. and Feb., 1876	*a* Eagley and Bolton	105	13			No typhoid fever cases at farm, which, however, depended for its water supply upon a brook which had been fouled with the excrement of men engaged in building a mill 200 yards off. There was evidence that some individual who had used the stream had suffered from diarrhea.	Dr. W. H. Power to local government board. J. Robinson, M. O. H., Brit. Med. Jour., 1876, pp. 201, 233, 273, 293, 491.
21	Autumn, 1876	Churwell and Morley	(4)	9			A case of fever at the farm; well water unfit for drinking purposes, but farmer denied having used it for dairy purposes.	Dr. J. G. Clark, M. O. H.
29	February, 1876	*b* Bolton Greenock	144 20	8			See No. 20. A farmer allowed a case to be brought into his house and after awhile 3 servants and several members of his family were taken sick with enteric fever, and communicated the disease to over 200 consumers of milk.	 Brit. Med. Jour., Vol. I, 1876, p. 425. Sanitary Record, Vol. IV, p. 234.

22	Nov., 1876	Great Coggeshall	28	----	28	100	Imported case of typhoid fever at dairy, dejecta thrown into a drain emptying into a brook which was used for dairy purposes.	Dr. R. T. Thorne, Official Report.
23	Dec , 1876	Salford	13	----	13	100	Sixteen cases of typhoid at the farm within twenty years. Well close to a privy cesspool, and a yard or so off was a sink for dirty water.	Dr. J. Tatham, M. O. H., Ann. Rep. of Med. Off. of Health for Salford, 1875-76.
24	Dec. and Jan., 1876-77	Barrowford, Lancashire.	57	7	57	100	Recent cases of typhoid at farm. Milk tins washed with the same dish cloth as used among fever patients; farmer nursed children and milked cows.	Dr. T. Dean, M. O. H., Medical Times and Gazette, Vol. I, 1877, p. 72.
25	1877	The Gurnos Ystalyfera.	7	----	7	100	Milk dealer's son sick with typhoid fever. Milk stored in a pantry leading out of the living room of a small, overcrowded house.	Dr. H. L. Parsons, Rep. on Sanitary Conditions of Ponkardarve rural sanitary district, 1880.
26	Jan., 1877	Greenock	20	2	16	80	No details	Dr. J. Wallace, M. O. H., Brit. Med. Jour., Vol I, p. 108.
27	Feb., 1877	St. Pancras, part of the northeast district of parish	35	2	30	85	Sudden and explosive outbreak traced to a milk supply, with no evidence of enteric fever at milk shops or farms. Water supply contaminated with filth.	Dr. T. Stevenson, M. O. H., Brit. Med. Jour., Vol. I, 1877, pp. 275 and 329.
28	Aug., 1877	Edinburgh, Coltbridge.	......	(5)	......	...	A case of typhoid fever at dairy communicated the disease to over twenty families.	Brit. Med. Jour., Vol. II, etc., 1877, p. 392.
29	Oct. and Nov., 1877	Tunbridgewells	68	----	......	...	Milk supplied from various sources; no typhoid fever at the farms, but at one of them the sewage of the town flowed through the cowyard; in the village there had been cases of typhoid fever.	Dr. W. H. Rix, M. O. H.
30	Dec. and Jan., 1877-78	Glasgow and Hillhead.	166	16	......	....	Typhoid fever at 1 of the supplying milk farms; nursing performed also by dairy hands, dejecta thrown into a channel running on each side of the central passage provided in byres for cattle droppings From the middle of the byre the washing house was entered, and through this the milk-house.	Dr. J. B. Russell, M. O. H., Brit. Med. Jour., Vol. I, 1878, pp. 101, 165, 270.
31	Jan. to Mar., 1878	Morsside near Manchester.	32	3	29	90	Two deaths from typhoid at farm in February. Well in close contiguity to ash pits, and water found to be sewage polluted.	Dr E. Sutcliffe, M. O. H., Med. Times and Gazette, Vol. I, 1878, p. 517.
32	July and Aug., 1878	Bristol[6]	131	12	131	100	A young lady visited the farm in June, just convalescing of typhoid fever. One of the farm servants ill Aug. 1. Cesspool overflowing and its contents were traced by a recurrent course to well, which was used for dairy purposes.	Dr. D. Davies, M. O. H., Brit. Med. Jour., Vol. II, 1878, p. 226. Sanitary Record, Vol. II, 1878, pp. 100-166.
33	Aug., 1878	Croydon	48	----	37	77	A sudden and explosive outbreak traced to a milk supply, but no evidence of enteric fever at the source of supply.	Dr. C. W. Philpot, M. O. H., Ann. Report, 1878. Brit. Med. Jour., Vol. II, 1879, p. 675.

[1] Washington street epidemic. [2] And 30 suspicious cases. [3] Pollock Shaw's road and Kingston epidemics. [4] A great number. [5] Several deaths.
[6] There was also a supposed outbreak of milk typhoid at Bristol, 8 cases in 5 houses in spring of 1880. Their common milk supply was the only connection.

Epidemics of Milk-Typhoid. (*Hart.*)—CONTINUED.

No.	Date.	Place.	No. of cases.	No. of deaths.	No. of cases among milk consumers.	Per cent.	Circumstances of the outbreak.	Reporter and reference.
34	Sept., 1878	Portsmouth	153	----	78	64	Farmer's children had typhoid fever and no doubt poisoned the well, for two children who were out walking and drank water from this well were subsequently attacked. Milk supplemented from another farm where well was within a few feet of cesspool of a common privy.	Dr. G. Turner, Brit. Med. Jour., Vol. II, 1879, p. 675
35	Sept., 1878	Colston near Glasgow.	40	----	40	100	Infected clothing brought to a dairy farm to be washed. On the 14th and 15th days later, symptoms of enteric fever appeared in persons receiving milk from this farm; also a convalescing child brought to farm. Water supply on premises deficient; shallow dip well, but not used for drinking purposes.	Dr. J. Christie, Sanitary Record, Vol. IV, p. 342.
36	Oct., 1878	Perth	(1)	----	------	----	All the families in which the disease appeared had their milk from one dairy.	Brit. Med. Jour., Vol. II, 1878, p. 645.
37	Dec. (Christmas), 1878	Dublin	------	----	67	100	A probable case of typhoid at dairy in November and middle of December. "A strong wind blowing into the yard would certainly waft particles of coal ash, etc., from the dung heap; to these minute portions of human excreta might have adhered." Nurses also connected with dairy.	Dr. C. A. Cameron, M. O. H., Dublin Jour. of Med. Sci., July, 1879, Pt. I.
38	Nov., 1878	Huncoat	12	----	12	100	Children of farmer sick with typhoid fever. Father would nurse the children and also attend to the cattle.	Dr. T. Dean, M. O. H., Sanitary Records, Vol. IV, p. 362.
39	Feb., 1879	Chichester	50	6	------	----	Milking hovel near a stream which received large quantities of filth. Milkmen washed udders of cows with water from the stream, which probably at the time contained the specific poison. Privy pit only 8 yards from well, but no history of any recent typhoid at the farm.	Dr. Hubert Airy, Brit. Med. Jour., Vol. II, 1879, p. 475.
40	Oct., 1879	Bristol	(1)	----	------	----	Milk traced to a suspected farm where there was no enteric fever, but water from pump in a dairy absolutely stunk when pumped, and was described as "simply poisonous."	Dr. Davies, M. O. H., Brit. Med. Jour., Vol. II, 1879, p. 625.

41	Jan., 1880	Penzance	26	4	26	100	Three cases of typhoid at the farm. The same person who milked the cows and attended to washing of dairy utensils, also nursed the patients.	Dr. G. B. Millett, M. O. H., Brit. Med. Jour., Vol. II, 1880, p. 37.
42	April, 1880	Glasgow	508	69	373	73	Dairymen of the farm sickened with enteric fever in March. Subsequently some of the children took sick and lay in bedroom next the kitchen; also dairymaid was taken sick and occupied a room above milk and wash house. Soiled discharges from sick bed washed at dip well, probably also used for other domestic purposes.	Dr. J. B. Russell, M. O. H., Brit. Med. Jour., Vol. I, 1880, p. 985.
43	April, 1880	Possilpark, Glasgow	92	....	90	97	(See above, No. 42.) Dairyman supplied milk shops in Possilpark also.	Dr. J. Christie, Brit. Med. Jour., Vol. I, 1880, p. 864.
44	July to Sept., 1880	Millbrook, Cornwall	19	....	19	100	Six cases of typhoid within three weeks at milk seller's house; milk kept in a filthy apartment near a badly trapped and very offensive drain inlet, which drain communicated with another which had received infected excreta.	Dr. E. Ballard, Brit. Med. Jour., Vol. I, 1881, p. 20.
45	Sept., 1880	Rochdale	35	9	26	74	In a cottage between the farmhouse and shippen[2] a woman had been suffering from typhoid fever, her excreta were thrown over the wall opposite the door into a cesspool, from which the dip of the soil inclines toward farm well. Cattle also waded about this cesspool. Milk probably diluted.	Dr. Joseph Henry, M. O. H., Brit. Med. Jour., Vol. II, 1880, p. 597.
46	Sept. and Oct., 1880	Portsmouth, Cambridge Barracks.	7	....	7	100	Milkman's son had fever with typhoid symptoms in a room upstairs, and dejecta had to be carried through the back kitchen, also used as a dairy. Infection being caused by absorption or by the act of milking being performed by attendants on the sick boy.	Surg. Maj. Jameson, Brit. Med. Jour., Vol. I, 1881, p. 61.
47	Oct., 1880	Bridlington	48	8	48	100	Convalescent from typhoid fever visited the dairyman's house, probably in September. The outbreak occurred in the early part of October. Dairy well close to manure pile; privies only 13 yards distant, water evidently largely contaminated by sewage.	Dr. J. Allison, M. O. H.
48	Oct., 1880	Marylebone, Clifton Hill, etc.	9	9?	1?	100	Nil. All cases occurred about the same date. Invaded houses not on the same side of the street, nor adjacent. Five out of six households invaded had their milk from one dealer.	Dr. A. W. Blyth, M. O. H., Brit. Med. Jour., Vol. I, 1881, p. 61.
49	Oct., 1880	Southport	32	2	32	100	No typhoid fever at a dairy, but well in close proximity and exposed to excremental pollution; water declared to be nothing but liquid sewage.	Dr. H. H. Vernon, M. O. H., Brit. Med. Jour., Vol. II, 1880, pp. 820-934.

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[1] Several cases.

[2] Cowhouse.

Epidemics of Milk-Typhoid. (*Hart.*)—CONTINUED.

(Outbreak No 50 and the succeeding 88 were collected by Drs. Busey and Kober.)

No.	Date.	Place.	No. of cases.	No. of deaths.	No. of cases among milk consumers.	Per cent.	Circumstances of the outbreak.	Reporter and reference.
50	Oct. and Nov., 1880	Worthing	44	8	44	100	A case of enteric fever in the house; excreta thrown into a defective drain, which was near the well used for dairy purposes; distinct evidence of soakage from the drain into well.	Dr. C. Kelly, M. O. H., Brit. Med. Jour., Vol. II, 1880, p. 934.
51	1868	Dover					Investigation convinced reporter that the milk was the vehicle of the poison and that it became infected by absorption and not through contaminted water.	Dr. M. K. Robinson, Trans. Int. Congress for Hygiene and Demogr., 7th session, 1891, sec. 3, p. 170.
52	Aug. 28 to Sept 3, 1872	Bergen	(1) 8		All	100	Enteric fever at farm. Wife acted as nurse and distributed the milk. Explosive outbreak. All cases taken sick between Aug. 28 to Sept. 3.	Dr. Holmloe, Nork Mag. f. Laegerk, 1873, p. 654; Hirsch Handbuch, Vol. I, p. 683.
53	Summer, 1875	Plon Holstein	(2)				Enteric fever at milk farm. Well highly polluted with refuse. Water used for cleaning milk utensils. No new cases after Sept. 5, when customers stopped purchasing milk, except in one family, who continued to buy the milk.	Dr. Lübe, Allegem, Zeitschft f. Epidem., 1876, Vol. II, p. 288.
54	Nov., 1878	Aberdeenshire	(2)				Piggery close to milk room; bad drain passed under the pump, whence the water for household was procured.	F. A. McEuen, London Practit., 1881, XXVI, 161-164.
55	Jan., 1879	Do.	15				Utensils washed from a well close to and under the level of the dung hill, and open to any sewage that might percolate in that direction.	Do.
56	Jan., 1881		(2)				Refers to several instances in which "milk had been liable to contamination either directly through persons suffering from the disease or indirectly through sewer emanations of water charged with the specific infective element of the disease for which the milk may also have acted as a cultivation fluid."	Dr. W. N. Thursfield, Sanitary Record, London, 1880-81, n. s. II, 243.
57	March, 1882	Leicester, Infirmary	12	2	12	100	A fatal case of typhoid fever at dairy. Polluted well. All patients had used unboiled milk.	W. Elgar Buck, Mid. Med. Misc., Leicester, 1883, II, p. 73.

58	May and June, 1882	Glasgow	59	6	50	85	Nearly all cases occurred within one week in May. None since June 1, "and its area has been most distinctly marked out in relation to the milk supply."	Dr. J. B. Russell, M. O. H., Brit. Med. Jour., Vol. II, 1882, July 8.
59	June, 1882	Allegheny City, Pa.	40	4	......	....	Typhoid fever at dairy. Well only 50 ft. from privy vault; the latter was full and higher upon the hill than the well.	Dr. D. N. Rankin, Pittsburg, Med. Jour., 1883, III, 289-292.
60	June, 1882	Clapham	20	....	19	95	All cases taken sick within 24 hours; all supplied with one exception, with milk from same dairy; health officer unable to explain milk infection.	Brit. Med. Jour., 1882, Vol. II, p. 216.
61	July, 1882	Halifax Stone Chair	11	1	11	100	Two cases of probable typhoid at farm. Father of farmer's wife arrived July 11, taken sick July 21; no medical attendant. His wife came to nurse him Aug. 14; taken sick Aug. 21; died Sept. 6. Unsanitary condition of farm; untrapped drain in room where milk was stored; polluted water.	Dr. Britton, Brit. Med. Jour., 1882, Vol. II, p. 749.
62	Nov., 1882	Newton Heath	60	....	......	....	Of the first 16 cases, 12 consumed milk from the same dairy; 2 obtained their milk from shops and 2 from still other sources; no details, doubtful connection.	Henry Tomkins and James Niven, London Lancet, 1883, Vol. I, pp. 360, 641.
63	July, 1883	Göteborg	4	....	4	100	Typhoid fever at milk farm and unsanitary conditions.	Dr. E. Almquist, Vrtljschr. f. Gesundhtspfl., 1889, XXI, 327.
64	Jan., 1883	Cologne	270	....	......	....	The cases were distributed in 54 households, all situated in the best part of the city. Typhoid among servants at milk farm; polluted water used in cleaning utensils.	Dr. B. Auerbach, Deutsche Med. Wochenschft., Berlin, 1884, X, 709.
65	Feb., 1883	Gateshead	44	6	44	100	All in 30 households supplied with milk from a farm where enteric fever prevailed among the children; the mother nursed and also assisted in milking and dairy work. Utensils kept in a dirty scullery.	Chas. Green, London Lancet, 1883, Vol. II, 986.
66	July to October, 1883	St. Pancras	431	62	368	....	Epidemic invaded 276 families, all using milk from a particular dairy farm where enteric fever started in a boy who arrived July 6, and sickened July 16.	Shirley F. Murphy, London Lancet, '83, Vol. II, p. 652.
67	Oct., 1883	Dundee	102	....	36	....	Disseminated by the sale of milk from a dairy kept by a man of whose family several members were sick with typhoid fever.	Brit. Med. Jour., 1883, Vol. II., p. 839.
68	Oct. and Nov., 1883	Englewood, N. J.	10	....	10	100	Typhoid fever case at dairy; a woman who assisted in nursing also helped to wash milk utensils.	D. A. Baldwin, Med. Record, N. Y., 1883, XXIV., p. 585.
69	Oct. and Nov., 1883	Port Jarvis, N. Y.	159	17	(3)21	80	Three cases of typhoid at milk farm in August and September. The bulk of epidemic cases occurred between October 24 and Nov. 15, the sale of milk having been stopped Nov. 4.	Dr. A. P. MacDonald, N. Y. Med. Times, 1883-84, XI., p. 328.

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[1] Families.

[2] Several cases.

[3] Either this number or the per cent in next column is probably wrong. H. B. B

Epidemics of Milk-Typhoid. (Busey and Kober.)—CONTINUED.

No.	Date.	Place.	No. of cases.	No. of deaths.	No. of cases among milk consumers.	Per cent.	Circumstances of the outbreak.	Reporter and reference.
70	Dec., 1883	Aberdeen	25	2	25	100	Daughter of the owner of the milk farm reported to have been ill with diarrhea; water from an open ditch polluted with sewage and the dejecta of a previous case of typhoid fever, located above the farm, had been used for dairy purposes. Milk supply diluted.	Dr. Simpson, M. O. H., London Lancet, Vol. I, 1884, p. 487.
71	Jan. and Feb., 1884	Upsala, Lakare Fören	42	----	42	100	Typhoid at milk farm and bad, unsanitary conditions.	Ernst Almquist, Vrtljschr, f. Gesundhtspfl., 1889, XXI., 327.
72	May and June, 1884	St. Albans	131	23	------	----	Of 396 houses supplied with the suspected milk, 86, or 21.7 per cent, were infected. Some of the milk sent to London affected consumers there. Milk obtained from a farm where cases of typhoid had occurred.	S. F. Murphy, Rep. Med. Off. local govt. board, 1884, Brit. Med. Jour., 1884, Vol. I., 1162, Vol. II., p. 1086.
73	October, 1884	Tweedmouth	23	----	23	100	All due to milk sold while there was typhoid fever at cow keeper's house, for which he was fined 3 guineas.	Sanitary Record, London, n. s., 1884-85, p. 204.
74	August and Sept., 1884.	Belvidere, Royal, and Western infirmaries, Glasgow.	143	32	------	----	Traced to a particular milk farm where dairy maid took sick at the same time as the outbreak in Glasgow. Prior to this cattle had suffered from febrile disease, attributed to drinking sewage water; enteric fever epidemic in adjacent villages; difficult to say whether infection originated with the cows or had been conveyed from another focus.	Dr. J. B. Russell, M. O. H., Brit. Med. Jour., 1884, II, 626, 724. Sanitary Jour., Glasgow, 1884-85, n. s., VIII, pp. 225-239.
75	October, 1884	Derby	40	---	40	100	Sudden outbreak among customers of a particular dairy, where 4 cases of typhoid fever had previously occurred. Well liable to gross pollution, being situated on the brink of a ditch which rec'd the drainage from the farm house.	Brit. Med. Jour., 1884, Vol. II, p. 786.
76	Nov., 1884; Mar., 1885	Groningen	58	----	46	79	Infected well at dairy	Dr. Ali-Cohen. Nederl. Tijdschr. v Geneesk., Amster., 1887, XXIII., 2d, pp. 78, 84.
77	Dec., 1884	Aberdeen	65	7	43	66	Numerous sources of contamination at the milk farm; well polluted.	Dr. Simpson, Brit. Med. Jour., Vol. I., 1885, p. 193.

78	Feb., 1886	Leichhardt, Australia	38	5			Sewerage polluted well at dairy	J. Ashburton Thompson, Austr. Med. Gazette, Sidney, 1885-6, Vol. V., p. 265.
79	July, 1886	Swanage Dorset					This epidemic of typhoid fever at its commencement was associated with the use of milk from a dairy, situated near a polluted brook, and no other water supply was on the premises.	Mr. W. Harvey, Rep. Med. Off. local govt. board, 1886, No. 16, p. 294.
80	July, 1886	Lancing College, Shoreham.	14 80-100	2	14	100	Outbreak originally traced to cream derived from a certain dairy, where no other evidence could be found than a liability of the well to pollution.	Dr. C. Kelly, London Practit., 1886, XXXVII, pp. 223-231.
81	October, 1886	Carlisle	30		24	(1) 59	Traced to a dairy where typhoid cases had existed, preceded by a febrile disorder among the cows; water supply and sanitation being quite good.	William Brown, Sanitary Record, London, 1887-88, n. s IX, pp. 10-15. Practit., London, 1888, XV., pp. 382-392.
82	Nov. and Dec., 1886	Cambridge, Mass.	73				The epidemic invaded 36 families, and was traced to a certain milk farm where a child was ill with typhoid fever; the father had entire charge of the nursing, emptied the excreta, and also prepared the milk for the market.	Chas. Harrington, Boston Med. and Surg. Jour., 1888, CXIX, pp. 49-52.
83	Feb., 1887	Göteborg	43		43	100	Affected 34 families, all supplied with a particular milk. Typhoid fever at milk farm, and suspicious sanitary conditions.	Dr. Ernst Almquist, Vrtljschr. f. Gesundhtspflg., 1889, XXI., pp. 327-338.
84	Aug., 1887	Do	5		5	100	In 3 families, typhoid fever at farm.	
85	1887	Denmark					Dr. Lehmann of Copenhagen, before the International Congress of Hygiene and Demographie, held at Wien, 1887, described 2 epidemics of typhoid fever traced to a certain creamery, and pointed out the difficulty of tracing infection when milk is received from a number of farms and mixed.	Deutsche Med. Wochenschrft, 1889, Vol 15, p. 17.
86	Mar., 1888	Göteborg	4				Typhoid fever at milk farm, and bad unsanitary surroundings.	Dr. Ernst Almquist, Vrtljschr. f. Gesundhtspflg, 1889, XXI., 327-338.
87	1888	Wash. Heights, N. Y.					Dr. Edson is quoted as having reported this epidemic of a disease resembling typhoid fever, confined to the customers of a certain milkman. On careful inspection of the cows 1 of them was found to be suffering from a loathsome abscess of the udder. The cow was being milked into the common pail. No other cause could be found, and the sickness speedily stopped when this cow was quarantined.	Brooklyn Med. Jour., 1888, Vol. 1, p. 182.
88	July to Dec., 1888	Spennymoor, Durham.	25	5			Outbreak occurred in 19 families, 11 of which were supplied with milk from a dairy where typhoid fever and evidence of polluted water were found.	Dr. David Page, Public Health, June, 1889; Lancet, London, 1888, Vol. II, p. 941.

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[1] Appears to be wrong. Should be 80? H. B. B.

Epidemics of Milk-Typhoid. (Busey and Kober.)—CONTINUED.

No.	Date.	Place.	No. of cases.	No. of deaths.	No. of cases among milk consumers.	Per cent.	Circumstances of the outbreak.	Reporter and reference.
89	1888	Evesham	6	1	5	83	Typhoid at dairy; milk adulterated with polluted water.	Dr. Fosbroke, Public Health, Feb., 1889.
90	1889	Country town in New York.	200 (1)	----	------	----	Investigation showed that only the customers of a certain milkman were affected. His well was contaminated by the drain of a neighbor's house in which typhoid had recently occurred. Water used to wash milk cans, and possibly also for adulteration.	Dr. William M. Smith, quoted by Dr. Cyrus Edson, Med. Record, N. Y., XXXV, 1889, p. 10.
91	1889	St. George, Hanover Parish.	----	----	------	----	Dr. Barry, medical inspector, reports to the local government board on this sudden and localized outbreak of enteric fever, which he attributed to temporary admixture of infected milk with the usual supply, and also refers to nuisance from sewer ventilators, etc.	Report Med. Off. local government board, 1889, p. 47.
92	Feb. to Apr., 1889	Dundee	23	----	23	100	All cases occurred among the customers of a particular dairy, and the most searching inquiries failed to find any trace of disease among the persons handling the milk or in the household, but one of the milch cows was suffering from a peculiar teat eruption, and as the disease declined upon stoppage of the milk, April 15, Dr. Anderson feels justified to regard the cow as an etiological factor. Other sanitary improvements were made in connection with sewer.	A. M. Anderson, Brit. Med. Jour., London, 1889, II, p. 465.
93	February, 1889	Stirling	40	4	40	100	Typhoid fever at milk farm; polluted water; air of the milk house liable to contamination. The epidemic affected especially families supplied with milk which had been kept overnight in the milk house.	Dr. McFadyan, Brit. Med. Jour., London, 1889, Vol. I., p. 1250.
94	March, 1889	Strand District, London.	10	----	10	100	Dr. Conway Evans, the medical officer of that district, reports that he had traced 10 cases of typhoid fever to the milk supply and was ordered to visit the farm and take necessary steps.	Brit. Med. Jour., 1889, Vol. I., p. 725.

95	June, 1889	Svarteberg, Sweden	104	11	......	....	Typhoid-fever cases at milk farm; contaminated water used for dairy purposes, also for adulteration of milk.	Ernst Almquist, Zeitschft. für Hygiene, Leipsic, 1890, Vol. VIII, 137-140.
96	July, 1889	Belgard	11	...	11	100	All the 11 typhoid fever cases had obtained their milk of the owner of a single milch cow, a poor woman, whose child was ill with typhoid fever, the milk being kept in a safe in the sick room, it being the only room at their disposal.	E. Roth. Deutche, Vrtljschr. f. öffentl. Gesundhtspfl., 1890, XXII, pp. 238-245.
97	July, 1889	Leeds	[2]20	(3)	......	....	No details as to the condition of the dairy farms given. Cases occurred in the best residential part and were traced to a particular milk supply.	Dr. Goldie, M. O. H., Brit. Med. Jour., 1889, Vol. II, p. 110.
98	November, 1889	York	120	....	......	....	Three cases of typhoid fever had occurred at the milk farm. Inspection revealed a probably infected well close to the privy; milk vessels kept close to privy and milk adulterated with 10 % of polluted water.	S. W. North. M. O. H., The Practioner, London, 1889, XLIII., 393-400.
99	Jan.-May, 1890	Geneve	63	....	......	....	The epidemic was traced to a particular dairy where the most unsanitary conditions were found. Men were seen spitting in their hands while polishing milk cans. There was also evidence of reckless watering of the milk with polluted water.	Dr. Vincet, Epidémie typh. propagée par le lait, Geneve, 1890, p. 15.
100	May, 1890	Forfar	36	....	......	....	Three cases of typhoid fever at the dairy farm whence milk was supplied to 28 families. Milk exposed to the contamination of an infected drain.	Dr. Murray, M. O. H., Sanitary Jour., Glasgow. 1890-91; n. s., XIV., p. 113.
101	May, 1890	Nottingham	7	....	7	100	Nephew of milkman sick with walking typhoid fever; continued at work. Milk supply stopped June 20. After June 26 no fresh cases occurred.	Dr. Phillip Boobyer, M. O. H., Annual Report, 1890, Public Health, London, 1891, 92, IV., p. 110.
102	June, 1890	Waterbury, Conn.	50	....	41	82	Typhoid fever cases at the milk farm from which at least 41 of the cases had consumed milk. One of the farm hands continued to work in the care of cans and at milking for a week before giving up; he also defecated in the cow stables throwing the stools into the barn yard and thus infecting material everywhere.	Dr. Herbert E. Smith, Sanitarian, N. Y., 1890, XXV., pp. 298-308.
103	July, 1890	Stittenseen, Hanover	103	....	......	....	This epidemic affected only persons who had drunk water from a specifically infected well or skimmed milk from a certain creamery supplied by 70 or 80 milk producers, and the evidence appears to indicate that this milk supply was contaminated by the owner of the suspected well adulterating the milk; 8 cases occurred in the house with the suspected well and 78 cases among contributors of milk to the creamery, and who, of course, were the largest consumers of their skimmed milk.	Dr. Schröder, Zeitschft. f. Med. Beamte, Berlin, 1891, IV, pp. 227-262.

[1] Nearly.

[2] Or more.

[3] Several deaths.

Epidemics of Milk-Typhoid. (*Busey and Kober.*)—CONTINUED.

No.	Date.	Place.	No. of cases.	No. of deaths.	No. of cases among milk consumers.	Per cent.	Circumstances of the outbreak.	Reporter and reference.
104	July, 1890	Wyandotte, Mich.	11	2	11	100	All supplied with milk from a stall-fed cow which drank water from a well polluted with animal matter. Cases continued to occur as long as this milk was used, and disappeared upon its stoppage, except in 1 family, who returned to the milk, and this was followed by 2 more virulent cases in the family. Professor Vaughan examined the milk and water bacteriologically, and while failing to discover Eberth's germ, he found similar pathogenic germs in both media, in larger proportion in the cow's milk.	Dr. E. P. Christian, Am. Lancet, Detroit, 1891, n. s., XV, pp. 121-128. Phys. and Surg., Detroit, 1892, XIV, pp. 337-343.
105	August, 1890	Lauchstadt	74	9	......	....	The first and greatest number of cases occurred at a watering resort, which was supplied both with water and milk from a farm where typhoid cases had occurred.	Dr. Penkert, Zeitschft. für Med. Beamte, Berlin, 1891, IV, p. 50.
106	August, 1890	Waversley, Randwick, Sidney.	89	....	......	....	These cases occurred in 89 households, and "the outbreak was clearly proved to be caused by contaminated milk." [We have been unable to refer to Dr. Thompson's original report.]	London Lancet, 1891, Vol. 1, p. 223.
107	August, 1890	Toorak, Australia	....	....	......	....	A number of cases occurred, all pointing to a particular milk supply derived from a farm which was watered by a creek to which the cows had free access; an orchard on which infected night soil had been deposited drained into the creek higher up. No evidence given whether the milk had been adulterated with this polluted water, where the cans were washed, or whether udders were infected while cattle waded in the stream.	Austrl. Med. Jour., 1890, n. s., XII, p. 422.
108	Sept. and Oct., 1890	Edinburgh	63	3	......	....	The outbreak occurred in 41 families who derived their milk from a farm where a case of typhoid was found, and 2 others subsequently occurred there Sanitary conditions bad; milk cans filled in a tainted atmosphere; water-supply found to be contaminated by sewage and liable to gross pollution. Milk supply was stopped until a better water-supply had been provided, after which no more cases occurred.	Dr. Harvey Littlejohn, Edinburgh, Med. Jour., 1880-91, XXXVI, Part II, pp. 801-814. Brit. Med. Jour., 1890, Vol. II, p. 1,318.

109	1891	U. S.	2	----	------	----	Dr. Brady describes 2 cases of typhoid fever which he attributed to infected milk, and considers it perfectly conceivable when we recall the sanitary condition of the average milk farm, and the dairy boy with bespattered boots, dirty hands and shirt, etc.	Dr. E. J. Brady, Cincinnati Lancet and Clinic, 1892, n. s., 28, p. 20.
110	1891	Decatur, Ill.	5	----	5	100	Typhoid fever at dairy conveyed by digital infection, as dairy hands also assisted in nursing the typhoid patients.	Dr. E. J. Brown, Trans. Ill. Med. Society, Chicago, 1891, XLI, pp. 145 148.
111	Feb., 1891	Avondale	12	----	12	100	Two cases of typhoid fever at a dairy. Milkers and dairy hands also assisted in nursing. Water probably contaminated and owner in the habit of diluting the milk.	Dr. E. W. Mitchell, Cincinnati Lancet and Clinic, 1892, n. s., 28, p. 647.
112	June, 1891	Grosse Isle, Mich.	8	1	8	100	All these cases received the milk from one cow which had no access to pure water, but drank from a nearly dried up swamp on the island. (No bacteriological examination of the water.)	Dr. E. P. Christian, Phys. and Surg., Detroit and Ann Arbor, 1892, XIV, 337-343.
113	August, 1891	Shawland, Glasgow	42	4	37	89	Mild case of typhoid at the farm in August. Dungpit located near byre received the typhoid excreta; the water supply contaminated from this dungpit; other unsanitary surroundings.	Dr. A. M. Campbell, Public Health, 1891-92, Vol. IV, p. 275.
114	October, 1891	Borough of Nanticoke, Pa.	42	----	31	74	A case of typhoid fever at the dairy farm, attributed to a contaminated well which received drainage from a cemetery.	Dr. L. H. Taylor, Annales, Hygiene, Philadelphia, 1892, Vol. VII, pp. 393-403.
115	Spring, 1892	Plymouth, Eng.	12	1	12	100	A fatal case of typhoid occurred at the milk farm twenty days before the present outbreak. The parents continued their dairy work while nursing their sick child.	Dr. F. M. Williams, M. O. H., Brit. Med. Jour., 1892, Vol. I, p. 1,157.
116	August, 1892	Springfield, Mass.	150	25	101	67	After a painstaking investigation, traced to a particular milk farm, where cases of typhoid had occurred ever since last spring. Well liable to infection from dejecta of patients. Milk contaminated by placing cans in the well for the avowed purpose of keeping the milk cool.	Drs. Sedgwick and Chapin, Boston Med. and Surg. Jour., CXXIX, 20, p. 485, 1893.
117	Aug. 20-Sept. 10, 1892	Somerville, Mass.	35	----	30	86	Epidemic traced to a particular milk supply. The son of this milkman handled and delivered the milk while suffering from a mild attack of typhoid fever, which had remained unrecognized until the investigation disclosed exact facts.	Dr. W. T. Chapin, Boston Med. and Surg. Jour., CXXIX, 20, 1893, p. 485.
118	Sept. 14-Oct. 15, '92	Greenwich, Rotherhithe.	61	----	56	91	This epidemic was limited to consumers of ice cream manufactured by Italian vender. Investigation revealed the existence of several cases of enteric fever in two ice cream shops, and much reason for believing that ice cream was prepared in dangerous proximity to the patients.	Dr. Geo. Turner, Practit., London, 1892, XLIX., p. 141, 160.

Epidemics of Milk—Typhoid. (Busey and Kober.)—CONTINUED.

No.	Date.	Place.	No. of cases.	No. of deaths.	No. of cases among milk consumers.	Per cent.	Circumstances of the outbreak.	Reporter and reference.
119	1893	Altenmuhr	(1)	----	------	----	A house epidemic existed at a certain farm. A young gentleman took sick with enteric fever, while visiting a neighboring chateau. He had been supplied with milk from this farm, and his female servants who carried the milk were taken sick likewise.	Dr. Franz Spaet, Arch. für Hygiene, München and Leipzig, 1893, XVII., p. 306.
120	1893	Bandon	(1)	----	------	----	In this instance Dr. Wepley traced the infection to a creamery which collected milk from a number of farms, at one of which a few cases of enteric fever occurred, infection originally carried from Cork. The milk at these creameries is separated, the cream made into butter, and the skimmed milk returned to farmer, thus causing intimate relationship, and the disease may easily become widespread among the users of milk.	Dr. Wepley, Brit. Med. Jour., 1893, Vol. II., p. 698; London Lancet, 1894, Vol. II., p. 1085.
121	Feb., 1893	Univ. of Virginia	14	----	14	100	These cases of a typical typhoid fever occurred among the students of the university, all boarding at the same hotel and consuming a particular milk supply from a dairy which is located on the banks of the creek, which receives the sewage from one of the main university sewers. An ignorant negro, who lives 1 mile above the dairy, had typhoid fever during the preceding fall, and his dejecta was thrown on the ground without disinfection. The milkman used creek water to wash the udders of the cows.	Dr. Wm. C. Dabney, Med. News, Philadelphia, 1893, LXIII, 630-632.
122	May, 1893	Oakland, Cal.	362	----	228	70	These cases occurred within one month, and as 70 per cent were consumers of milk from one particular dairy, a sanitary inspection was made and revealed the following facts. A typhoid fever house in close proximity; dejecta thrown on the ground close to a small dam in the creek, from which a pipe supplied a large tank 75 feet below with water for dairy purposes; moreover this polluted water flowed through the cow pasture.	Dr. S. M. Monser, Occident Med. Times, Sacramento, 1893, VII., pp. 503-504.

123	July, 1893	Paisley, Renfrewshire	86	----	86	100	This epidemic was traced to the consumption of ice-cream made at the premises of a vender where an unreported case of typhoid fever was found, and this patient had remained in contact with the business during most of her illness.	Dr. Campbell Munro, Brit. Med. Jour., 1894, Vol. II., p. 829.
124	Aug., 1893	Rostock	[1]	----	----	----	All traced to milk from a suburban dairy found in the most unsanitary condition; no privy, but a highly polluted well, which was used for washing the utensils and very likely also for adulteration.	Dr. Lesenberg, city physician, quoted by Dr. Dornblüth, Jahrbuch f. Kinder Krankheiten, 1893, XXXVI., p. 181.
125	July, 1893	Vicinity of Bethsada, Montgomery Co., Md.	15	1	15	100	This limited epidemic was intimately connected with a certain milk farm, the owner of which was obliged to use a neighbor's well, in whose family typhoid fever had occurred during the summer of 1892 Three weeks after using this well the first case occurred at the milk farm, and shortly after the owner of this well was also taken sick. This resulted in a cleaning of the well, which was found to be contaminated with a very foul sediment. a dead chicken, and other organic refuse. The season being unusually dry, and the ground water being low, had resulted in concentration of the impurities, and as this well had been used for dairy purposes, it was doubtless the source of infection.	Unpublished memoranda furnished by our friend, Dr. George Lloyd Magruder of Washington, D. C., and Dr. W. F. Elgin, of Montgomery Co., Ala.
126	July to Sept., 1893	Shildon, Durham Co.	----	----	----	----	In a very extensive epidemic of enteric fever a large share in spreading the fever was due to a particular dairy, where cases of typhoid fever existed and the wife, who managed the milk business, also nursed the sick children. There was, moreover, a direct connection between the sewer and the room in which the milk and utensils were kept.	Dr. Bruce R. Low, Rep. to the local government board on an outbreak of enteric fever at Shildon, London, April 23, 1894.
127	1894	Castle Island, Ireland	----	----	----	----	A serious outbreak was traced to a creamery receiving among others the milk from a farm where enteric fever had occurred, and which was handled by a person who also assisted in nursing those suffering from the disease. The cream had been seperated and the skim distributed in due proportions among the different farms.	Brit. Med. Jour., 1894, Vol. 1., p. 815.
128	Jan. and Feb., 1894	Richmond Hill, Surrey Co.	55	----	52	94	Traced to a common milk supply; no evidence of typhoid fever at the milk farm, although the disease had prevailed in the vicinity; very unsanitary contitions, such as liquid and semi-liquid filth surrounding 36 cows. The epidemic speedily subsided after stoppage of the milk supply from this dairy.	Drs. Rowland and Seaton, Brit. Med. Jour., 1894, Vol. 1, p. 1325.
129	Mar. and April, 1894	So. Lambeth	59	10	55	93	Traced to a particular milk depot, affording no other evidence except unclean methods and a water supply subject to pollution from a yard drain. The water tank, on being emptied, contained a deposit of 4 inches of offensive matter; no bacteriological examination.	Brit. Med. Jour., 1894, Vol. 1, p. 1148.

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[1] Several cases.

Epidemics of Milk-Typhoid. (*Busey and Kober.*)—CONTINUED.

No.	Date.	Place.	No. of cases.	No. of deaths.	No. of cases among milk consumers.	Per cent.	Circumstances of the outbreak.	Reporter and reference.
130	Mar., 1894	Montclair, N. J.	107	14	------	----	Of 44 families supplied with milk from a particular dairy, typhoid fever occurred in 28, or 63.6 per cent. Of 20 cases reported from Bloomfield and Glenridge, 18 were traced to the same dairy, where a case of typhoid occurred Feb. 11, but the sale of milk was not stopped until Mar. 29, and epidemic checked promptly after that date. Unsanitary condition at dairy and polluted well water.	Dr. R. C. Newton, Med. Record, N. Y., 1894, XLV., pp. 713-715.
131	May, 1894	Brixton	60	10	------	----	This epidemic was traced to a milk farm where the cows were partially fed on fresh grass cut from the fields of a sewage farm. It was also shown that water from a brook running through the same land, and presumably contaminated, had been used to adulterate milk.	Dr. Verdon, M. O. H., Brit. Med. Jour., 1894, Vol. I, p. 1112.
132	Aug., 1894	Montclair, N. J.	19	1	------	----	Fourteen of these cases were found in close proximity to a bakery where ice cream was sold and made in a very filthy place. A case of typhoid had occurred at this bakery, and persons who made the ice cream also assisted in nursing. Of 10 cases, 8 had used ice cream or milk from this bakery, and the disease was promptly checked upon closing the bakery.	Dr. Thomas Horton, Med. Rec., N. Y., 1894, XLVI, p. 651.
133	July, 1894	Bayhead, N. J.	15	----	15	100	This limited outbreak was confined to customers of a milk dealer who derived his supply from three dairies, at one of which a young man was taken sick July 1, with what proved to be a case of typhoid fever, and continued to milk his cows daily until July 11. The first case of typhoid fever among consumers of the milk occurred July 14, and the last case 19 days after this patient stopped milking. How the infection could be conveyed may "be left to the imagination of those who are familiar with the personal habits of some who work on dairy farms."	Dr. W. H. Katzenbach, N. Y. Med. Record, 1895, Vol. 47, p. 165.

134	Dec., 1894	Arbroath, Scotland	44	----	------	----	This epidemic was traced to an unrecognized case at a dairy. The patient there was a woman 64 years old who had been waited on by two other women, who also milked the cows, washed the milk vessels, and attended generally to the sale of milk. Many of the later cases of the outbreak were not directly attributable to the milk sale, secondary centers of infection having, as is quite common, been established.	London Lancet, Vol. II, 1894, p. 1517.
135	Jan., 1895	Great Harewood	80	5	------	100	Consumers of raw milk were attacked more virulently and with greater certainty than those persons who took the milk in coffee and tea. The chief symptoms were headache, often diarrhea, sometimes nausea, characteristic temperature, and frequently abdominal rose spots. Traced to a milk farm, where a young woman who assisted in milking the cows and looking after the cans had been sick since and prior to the outbreak with what she thought to be a cold. Upon examination she was found with a coated tongue, a pulse 108, temperature 100, and a few days after rose colored spots appeared on her body, in fact, a typical case of ambulatory typhoid fever. The decline of the outbreak, allowance being made for the period of incubation, coincided with her withdrawal from the dairy operations.	Dr. Edw. Sargeant, London Lancet, Vol 1, 1895, p. 1328; Brit. Med Jour., Vol. 1, 1895, p. 1110.
136	Apr. and May, 1895	Stamford, Conn.	307	----	------	----	Traced to the premises of a milkman whose barns were in the rear of his lot, surrounded on all sides by dwellings and outhouses; his tank for cooling milk was fed from a well 12½ feet deep and filled with water to within 1½ ft. of the surface. West of the pumps were two outhouses, one 20 feet and the other 15 feet each above the level of the bottom of the well, and the drainage of those led directly toward the pump. It is believed the typhoid germs were brought to this neighborhood by Italians who had been at work in the vicinity of the dairy and the disease was traced almost directly to their camp. The well water was examined by Dr. T. M. Prudden, and found to be swarming with bacteria.	Med. Record, N. Y., Vol. 47, pp. 562, 627.
137	Apr. and May, 1895	New Milford, Conn.	23	----	------	----	The daily papers contained accounts of an epidemic of typhoid fever which is prevailing in New Milford. The disease is said to have been distributed by milk obtained from a certain farm in the neighborhood. Up to May 9, 23 cases had been reported. (Details wanting.)	Med. Record, N. Y., Vol. 47, p. 627.
138	June 22, 1895	Woolwich	19	----	------	----	In 10 of these cases the milk was supplied from the same dairy and others from various sources. In 4 cases the milk supplied was from the Plumstead dairy, where the epidemic first broke out. This dairy has been closed by the authorities.	Brit. Med. Jour., Vol. 1, 1895, p. 1423.

Epidemics of Milk-Typhoid. (Baker.)—CONTINUED.

(Outbreak No. 139 and the eight succeeding ones were collected by Henry B. Baker, M. D.)

No.	Date.	Place.	No. of cases.	No. of deaths.	No. of cases among milk consumers.	Per cent.	Circumstances of the outbreak.	Reporter and reference.
139	Nov., 1895	Providence, R. I.	31	3	31	100	A milkman kept no cows, but obtained his milk from two farmers in the same town. On one farm no trace of disease could be found; on the other it was learned that there had been two cases of typhoid. The nurse taking care of the milk as well as the sick. When this fact was learned the milk from this farm was not sold and the epidemic stopped.	Report of Supt. Health Dept., Chas V. Chapin, M. D., Providence, R. I., in report of Dec., '95.
140	May, 1894	Montlignon, near Paris.	----	----	------	----	First case, origin unknown, recovered. The clothes of the person having been sick, were washed in a brook which flowed past a milkman's place. This milkman had been in the habit of washing his pails in this brook. Dr. Hourlier is convinced that the milkman carried disease to his customers in the milk served them. Dr. Hourlier traced another case to another dairyman, who, being out of milk, borrowed from the first and became sick.	Dr. Hourlier, in the Progrès Médical.
141	Sept., 1894	Marlborough, Mass.	49	----	49	100	Apparently due to infected skimmed milk. A man was engaged in peddling milk from a creamery, located in the midst of the infected district. He was taken sick with typhoid about the time the epidemic was raging its highest, but facts in his illness went to show that he might have been the unconscious cause of the whole epidemic. He continued at his work for 10 or 12 days before taking to his bed, during which time he had typhoid symptoms.	Report of W. T. Sedgwick, in Mass. Am. Report, year 1894, p. 765.
142	Winter of 1872-73	Near Birmingham, Eng.	50 (¹)	----	47	94	Defective sanitary conditions on the dairy farm. Dejecta contaminating the water in the well. The dairyman used the water in the well to dilute his milk.	Ernest Hart, D. C. L., Brit. Med. Jour., July 13, '95, p. 89.
143	1875	Renfrewshire, Eng.	153	----	153	100	"Unmistakably to a particular milk service"	Do.

144	1876	Leeds	----	----	------	----	A case of typhoid existed on a farm. The cow, whose milk was used only for domestic supply, refused to graze. She was sent away and convalescence of the patient set in. The fact developed that in her first pasture, her water supply was contaminated by the drain of a sewer.	Do.
145	May and June	Plumstead, Eng	177	23	159	90	Actual source of disease could not be definitely located, but was distinctly traceable to a particular milk supply. On the dairy farm, the drains were very defective, the cow sheds dirty, and business conducted in a slovenly manner.	Dr. Sydney Davies, Brit. Med. Jour., Dec. 21, 1895, p 1561.
146	April, 1895	Stamford, Conn.	386	22	376	97	This epidemic was caused by infected milk. Origin of the infection not satisfactorily determined. The probable supposition is that the milk became infected from contaminated well water used in washing the cans. Privy 25 ft. from well and natural surface drainage toward the well. Privy had a shallow vault and was leaking at the top. Water in well 1½ ft. from land surface. Sanitary conditions of the dairy building poor. One low frame building in which were the cow stables, and also, at one end of which was the sink used for washing the cans.	Dr. Herbert E. Smith, Report on the Stamford typhoid fever epidemic, Connecticut. Library No. 9603.
147	June, 1890	Waterbury	50	----	41	88	Three cases of typhoid appeared on the dairy farm One case of ambulant typhoid fever—one week Dairy work not done with sufficient caution Milk set to cool in a tank near to the manure heap Tops of cans opened slightly and subject to infection from particles floating in the air. Deficient sanitary conditions about the farm, and particularly in the dairy room.	Dr. Herbert Smith, Report State Board of Health, Conn., 1890, p. 243, also Pamp. Library No. 7516.

[1] Households.

Epidemics of Milk-Typhoid. (*R. G. Freeman, M. D.*)—CONCLUDED.

(Outbreak No. 148 and the ten succeeding ones were collected by R. G. Freeman, M. D.)

No.	Date.	Place.	No. of cases.	No. of deaths.	No. of cases among milk consumers.	Per cent.	Circumstances of the outbreak.	Reporter and reference.
148	Aug., 1881	Hawick					Nearly every case received milk from a farm where typhoid prevailed. Milk supply stopped.	Br. Md. Jr., '81, ii., 273.
149	1881	Christ Church, New Zealand.					All houses infected (including a lunatic asylum) were supplied by same dairy. Dairy premises in a filthy condition.	Br. Md. Jr , '81, ii , 570.
150	1882	Glasgow					Cases were consumers of milk from a dairy where typhoid had recently existed.	Br. Md. Jr., '82, ii , 590.
151	Nov., 1882	Grangemont					Cases supplied with milk from a house where there was a case of typhoid. Milk was ordered destroyed until the typhoid patient was removed.	Br. Md. Jr., '82, ii., 911.
152	Jan.-July, 1883	Cologne	280		61		Several cases of typhoid at a dairy. One case nursed near cow stables.	Auerbach, Schmidt's Jahrb , '83, ccvii , 72.
153	1883	Warwickshire	12	1	12	100	Milk dealer died from typhoid and his son contracted it from him. Milkman's water supply polluted.	Br. Med. Jr., '83, i., 1, 136.
154	1883	Upsala	37				Followed typhoid in milkman's family	Almquist, Ztschr, für Hyg., Vol. 890, p. 137.
155	Oct. to Dec., 1884	Port Jervis	148		128		Typhoid at dairy in August and September, three cases. These were nursed by the same person who attended to the dairy work.	Curtis, Rep. N. Y. Bd. of Health, '84, 185.
156		Minnègue					All the cases had milk from one dairy. In one family all who drank the milk raw, contracted typhoid, while, those who drank it cooked escaped. Water supply near privy. Case of typhoid previously in farmer's family. Epidemic stopped with the withdrawal of milk.	Janssen, Rouvier, Le Lait, p 208.
157	July-Aug., 1888	Providence	96		86	96	Three cases of typhoid at dairy. One a few weeks preceding epidemic.	Swartz. (Reference not published.)
158	1888	Durham	12		12	100		O'Hanlon, London Lancet, '88, ii., 941.

159	Nov., 1888	Cambridge, Mass.	73		58		Traced to one milk route. Typhoid fever found at one of the farms supplying this milk route.	Harrington, Rep. Mass. Bd. of Health, '88, p. 25.
160	Mar., 1889	Melbourne	43		43		Originated in a case in the family of the milk dealer.	Allen, Intercol. Med. Congress, Melbourne, '89.
161	1890	Geneva, Switzerland					Traced to the milk of one dairy. It was shown that the dairyman washed his pails in a stream in which the linen of a typhoid patient was washed. Milkman sued dairyman for damages and got 1500 francs.	Vincent, Lancet, '90, ii., 730; Br. Med. Jr., '92, i., 1279.
162	1891	Whitechurch					Cases occurred among drinkers of milk from a dairy where a child sick from typhoid was allowed to handle dairy utensils. Milk dealer fined.	Br. Md. Jr., '91, ii., 1179.
163	Feb. to Apr., 1891	Sutton, Coldfield	40	5	40	100	All cases had contaminated milk. Epidemic stopped by stopping milk supply.	Hill, Br. Md. Jr., '91, p 136.
164	Aug. and Sept., 1892	Dundee	82	6	43		Typhoid at dairy in August. Milk supply stopped August 28th.	Anderson, Br. Md. Jr., '92, ii., 902.
165	June, 1892	Nottingham	7		7		Dairy assistant worked for three weeks while suffering from fever, vomiting and diarrhœa. Dairy supplied twenty-six families.	Boobyer, Public Health, '92, iv., 110.
166	Dec., 1891, to Jan., 1892	Clermont, Ferrand	23	6	18		Originated in dairy where the proprietor and his daughter had typhoid.	Gayon, etc., Rev. de H., '92, 993.
167	1892	Near Leeds					Every case except one supplied by milk which had been mixed with contaminated water.	Ballard-Arnley, Stevenson and Murphy, Hygiene, i., 334.
168	Aug., 1893		23		23		Creamery case. Typhoid on one of the farms contributing to the creamery. Nineteen cases infected from the creamery milk.	Welpey, Lancet, '94, i, 992.
169	1893	E., near Strasburg					All the cases had milk from one milkman. Seventeen per cent of those who drank the milk had typhoid, while among three hundred others there was no case. Epidemic stopped on withdrawal of milk.	Schmidt, Hyg. Rundsch., 94, p. 694.
170	Oct., 1895	Shettleston	35	2	15		Case of typhoid at dairy in September. Dairy supplied sixteen families and seven of these, or over forty per cent, suffered.	Wilson, Br. Md. Jr., '95, ii., 1204.
171							A farmer nursed his son sick with typhoid; twenty-one days later typhoid became epidemic in two institutions supplied by him with milk, as well as in most of the families he supplied.	Tripe. Rouvier de Lait, p. 209.

x

THE RELATION OF THE FUNERAL DIRECTOR TO THE PUBLIC HEALTH.*

BY HENRY B. BAKER, M. D., SECRETARY OF THE STATE BOARD OF HEALTH.

"*Mr. President and Members of the Association:* As you all well know, it is time that the people generally should awaken to the fact that the funeral director has very important relations to the public health.

It is time that the representatives of the people—the legislature—should follow in the direction taken by the more progressive States and make provision for more completely guarding the public health by requiring that all funeral directors shall have qualifications for the performance of their duties with safety to the living. Such action would promote the public health, and tend to add dignity and standing to those engaged in this occupation.

It is easy to laugh or even to sneer at the efforts of different classes of people to elevate the standard of their class, but if each and every class makes a successful effort for its own elevation, there will be a general uplifting and betterment of the whole people. No person who has the welfare of mankind at heart can bring himself to oppose any such movement. Recently in a daily newspaper there was an item headed "Just like the doctors," which alleged that the barbers of Saginaw and Bay City had formed an association to get a law passed by the legislature requiring examination of all barbers before permission to serve as barbers. Well, what is there to sneer at if the barbers do want to have all their class well qualified for their work? To my mind, however, that is not nearly so important as it is that the doctors and the funeral directors should all be qualified, because the doctors and the funeral directors almost constantly deal directly with questions of life or death. It seems almost incredible that the quacks, incompetents and irregular physicians have thus far been able to prevail with the legislatures and governors in Michigan so that no law has been passed providing qualifications for doctors. But the lawyers, the dentists, and the pharmacists have been successful before the legislature, and all these have laws for the elevation of the standing of their respective classes; so there is hope for any class of workers which has not within its own ranks too many incompetents or dishonorable members influential with the governors and legislatures. I sincerely trust that your association may succeed in its efforts for the elevation of your class of workers.

It is only within recent times that it has come to be understood that most of the diseases which cause the most deaths, that is that our most common diseases are communicable, that is to say may in some way be spread from person to person, directly or indirectly. Until this fact is thoroughly grasped by the people, they cannot well realize the great importance of having funeral directors well educated in the modes by which the dangerous diseases are spread, and in the best measures for the restriction of the several diseases. It is not yet understood, as it should be, that some of our most common diseases may be spread from the corpse of a person who has died of one of those diseases. We have all come to be so familiar with consumption, for instance, that it is difficult for us to realize that consumption may be spread by the corpse of a consumptive; but there can be no reasonable doubt that the sputa of a consumptive on the lips, hands, or any article of clothing of a dead body is as capable of causing tuberculosis as it is known to be during the life of the consumptive patient. In consumption the chief source of danger is the sputa; but the specific cause of the disease—the bacillus tuberculosis—may be in any organ or tissue of the body. The specific cause may be inoculated in a cut; or, when dried and in the form of dust, it may be breathed in with the air inhaled. Tuberculous sputa on the lips, or smeared on the face or hands may be as liable to become dry and pass off into the air as is the case with the sputum of diphtheria; and diphtheria has frequently been traced to exposure to a corpse. In consumption, the period of incubation is so long that it is not likely the disease could be traced; but that it may be thus spread seems very probable, in fact almost certain. Contrary to the usual opinion held by physicians, statistics prove that consumption is most dangerous to people over fifty years of age.

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*An address to the Michigan Funeral Directors' Association, Kalamazoo, July 8, 1896.

Diphtheria is most dangerous to persons under ten years of age. The specific cause of diphtheria is usually in the throat, and in the sputa, and whatever may have the sputa smeared on it, as the lips, face, hands, clothing, etc. The disease may be inoculated, but apparently is usually spread by means of the dust of the dried sputa.

Scarlet fever is spread in the same way. Physicians believe, also, that scarlet fever is spread by the dust of the branny scales that are on the surface of the body of a person convalescing from scarlet fever, but quite generally if the dead body falls into the hands of the funeral directors it does so before that stage of the disease is reached, so that practically the same measures are needed with reference to scarlet fever as with reference to consumption and diphtheria; but in scarlet fever the possibility of the disease being spread by every surface of the body should be held particularly in mind and acted upon, by the funeral director.

Pneumonia is now known to be caused by a specific micro-organism, a germ, which is present in the sputa, and may therefore be wherever the moist sputa may be smeared, or wherever the dust of the dried sputa may be wafted.

Influenza or *La Grippe* is believed to be caused by a specific germ. Funeral Directors may, therefore, guard against the spread of that disease by anything on which the sputa of the disease has come.

Typhoid fever is now known to be caused by micro-organisms which have their home in the spleen, liver and other organs and tissues of the body. Recently a very important fact, which should be known and acted upon by funeral directors, has come to our knowledge. That is that in a considerable proportion of cases (six out of seven in one investigation) the urine is almost a pure culture of the germs of the disease. As the germs of typhoid fever are not rapidly destroyed by drying, any article of clothing, bed-linen, etc., on which urine from a person sick with typhoid fever has come may be the means of spreading the disease. As the germs of typhoid fever may go to every organ and tissue of the body, the sputa and the sordes on the tongue and teeth of the corpse may contain the germs of the disease.

The diseases which I have named are those which are the most common—those which cause most deaths. They are all communicable. All these diseases may be spread by ignorant or careless methods by those who deal with the bodies of persons dead from those diseases. These facts supply good and sufficient reasons why every funeral director should be thoroughly well informed with respect to the latest knowledge of the modes of spreading and the best measures for restricting the dangerous diseases.

But these are not all the facts tending in that direction. In every year new discoveries are being made, diseases not before supposed to be communicable are found to be so; and the probability now is that every important disease is specific, that is, it is due to some specific cause, which it is the duty of science to find, and to learn the modes by which it is spread.

Modern surgery has demonstrated that, by methods which those sciences grouped around the now well-established germ theory of disease, have been instrumental in evolving, all inflammations, all suppurations are to be avoided by the exclusion from the body of all germs. If the funeral director is to serve the people with safety, he must have a good working knowledge of the principal facts which have been established by modern bacteriologists, modern surgeons, and modern practical sanitarians. I am happy to know that the funeral directors' association of Michigan is fully alive to this fact. I hope that your association may be successful in keeping the funeral directors in Michigan as a whole in the front ranks in these important particulars.

There are here for distribution copies of a four-page leaflet [226.] issued by the State Board of Health entitled "Dangerous Communicable Diseases—How Spread, How Restricted and Prevented"—which I hope you will find useful as brief memoranda relative to each of the most important diseases. There are here also copies of a two-page leaflet [228.] with reference especially to Act 45, Laws of 1895, which relates to the movement of bodies dead from communicable diseases. The leaflet contains about all that I should wish to say on that subject, so it will not be necessary to take up your valuable time now, with what you can all read at your leisure. One question has arisen since the publication of that leaflet, namely the refusal of a health officer to grant a permit, which leads me to say that the fact that the law forbids bringing a body dead of a dangerous communicable disease into a locality *without* "the permit of the board of health or of the health officer" of that locality, implies that it may be brought *with* such permit, and is implied authority for the granting of such a permit by the health officer, under proper regulations for the public safety. If, however, a health officer refuses to grant a permit in any given case, application can be made to the local board of health, and every local board of health in Michigan is by statute authorized to grant a permit "when they shall think it safe and proper so to do,"—(Section 1646, Howell's Statutes, and Act 145, Laws of 1879).

Besides the State Laws relating to the transportation of dead bodies, there are other requirements which are just as rigid as State Laws,—I refer to the rules of the railroads. And these rules relate to all bodies dead of any disease or cause. Rules 52 and 53 of the American Association of General Baggage Agents refer to this subject. They are too long for me to read now, a copy of them is appended to this paper.

The people at large would have greater liberty if funeral directors were restricted to those qualified. This may appear strange, but I think it is a fact. Many people who lose children or friends by death from diphtheria would be glad to transport them by railroad to the home cemetery. This cannot now be done, because the railroads and the law in a few States forbid. At the recent meeting of the National Association of State Boards of Health the subject was discussed, and it seemed to be agreed that the only thing which stands in the way is the difficulty of being sure that the body is prepared in accordance with the present scientific requirements for the public safety. If there were no funeral directors except those found on examination to be qualified, and they were licensed under a good law, there would be no difficulty in so preparing any body, dead from any cause, that it might be transported with safety to the public, and there would then be a legally-organized body of licensed persons capable of making the preparations and of making a certificate that should satisfy the health authorities and the railroads; then the mourners throughout the land might feel grateful that their loved ones could take their final rest in the home cemetery.

The present requirements relative to all dangerous communicable diseases—that there shall be no public funeral, is very trying to the hearts of the people. Such a requirement is necessary under present conditions. Sanitary science, however, is equal to the task of devising means for rendering public funerals safe; but the subject cannot be entrusted to an irresponsible rabble of persons engaged in any line of business. When funeral directors are all licensed after being properly tested as to requirements there is reason to hope that the heartstrings of mourners will cease to be tormented by the apparent disrespect to the dead involved in the absence of a funeral.

Another public interest demands that there shall be co-operation of the funeral director with the officers of health and of justice to the end that no murderer shall escape justice through a wrong or premature action for embalming a dead body. No body should be embalmed until the cause of death has been enquired into and placed upon record.

It cannot be expected that legislation will do all that is required for the uniform advancement of the standing of funeral directors; but it should make it possible that only educated and qualified persons could enter upon that important service for the people. It ought to be possible for the Michigan Legislature to pass a better law than has been enacted in any other State; but if Michigan had as good a law as the one approved June 7, 1895, in Pennsylvania, it would be better than none. One suggestion as to the membership of the proposed State Commission to make the examinations of funeral directors, is that—inasmuch as one great purpose of the examination and registration of funeral directors is the better protection of the public health, the State Commission should contain at least one person especially skilled in sanitary science, and one well skilled in public-health laws. And I can see no objection to there being one or two members of the commission who are not funeral directors; although I think the majority of the commission should belong to the class of workers to be regulated by the law.

Blank form for a letter used by the Secretary of the State Board of Health.

STATE BOARD OF HEALTH, MICHIGAN.
OFFICE OF THE SECRETARY,
Lansing,

Before I can issue a statement which will answer the purpose of a permit for the transportation of a dead body, it is necessary for me to have the following:—

1. A certificate of the cause of death, by the attending physician, including not only the immediate cause of death, but also the sickness which led up to it.
2. The permit of the health officer of the place *from* which the body is to be removed.
3. The permit of the health officer of the place *to* which the body is to be removed.
4. The assurance of the health officer of the place from which the body is to be removed, that the body shall be carefully prepared for transportation, strictly in accordance with Section 6 of Rule 52, of the General Baggage Agents' "Rules" which have been approved by this Board, and which may be seen at each railroad station, and on the back of this sheet.

PREPARATION AND TRANSPORTATION OF CORPSES.

RULES ADOPTED BY THE AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS AT MACKINAC ISLAND, MICHIGAN, JULY 20, 1892.

Approved by the Michigan State Board of Health, at Lansing, April 14, 1893.

RULE 52.—*Corpse, How Prepared for Transportation.*

SECTION 1. The transportation of bodies of persons dead of small-pox, diphtheria, Asiatic cholera, leprosy, typhus fever, or yellow fever, is absolutely forbidden.

SEC. 2. The bodies of those who have died of anthrax, scarlet fever, puerperal fever, typhoid fever, erysipelas, measles, and other contagious, infectious, or communicable diseases, must be wrapped in a sheet thoroughly saturated with a strong solution of bi-chloride of mercury, in the proportion of one ounce of bi-chloride of mercury to a gallon of water, and encased in an air-tight zinc, tin, copper, or lead lined coffin, or in an air-tight iron casket, hermetically sealed, and all enclosed in a strong, tight wooden box; or, the body must be prepared for shipment by being wrapped in a sheet and disinfected by a solution of bi-chloride of mercury as above, and placed in a strong coffin or casket, and said coffin or casket encased in a hermetically sealed (soldered) zinc, copper, or tin case, and all enclosed in a strong outside wooden box of material not less than one inch and a half thick.

SEC. 3. In cases of contagious, infectious or communicable diseases, the body must not be accompanied by articles which have been exposed to the infection of the disease. And, in addition to permit from Board of Health or proper health authority, station agents will require an affidavit from shipping undertaker, stating how the body has been prepared and kind of coffin or casket used, which must be in conformity with Section 2 of this Rule.

SEC. 4. The bodies of persons dead of diseases that are not contagious, infectious, nor communicable, may be received for transportation to local points in same State, when encased in a sound coffin or metallic case, and enclosed in a strong wooden box so it may be safely handled. But when it is proposed to transport them out of the State to an inter-state point (unless the time required for transportation from initial point to destination does not exceed 18 hours), they must be encased in an air-tight zinc, tin, copper or lead lined coffin, or an air-tight iron casket, or strong coffin or casket encased in a hermetically sealed (soldered) zinc, copper, or tin case, and all enclosed in a strong outside wooden box of material not less than one inch thick In all cases the outside box must be provided with four iron chest handles.

SEC. 5. Every dead body must be accompanied by a person in charge, who must be provided with a ticket, and also present a full first-class ticket marked "corpse," and a transit permit from Board of Health, or proper health authority, giving permission for the removal, and showing name of deceased, age, place of death, cause of death (and if of a contagious or infectious nature), the place to which it is to be shipped, medical attendant, and name of undertaker.

SEC. 6. It is intended that no dead body shall be moved which may be the means of spreading disease: therefore, all disinterred bodies, dead from any disease or cause, will be treated as infectious and dangerous to the public health, and will not be accepted for transportation unless said removal has been approved by the State Board of Health, and the consent of the health authority of the locality to which the corpse was consigned has first been obtained, and the disinterred remains enclosed in a hermetically sealed (soldered) zinc, tin or copper lined coffin or box, or box encased in a hermetically sealed (soldered) zinc, tin or copper case.

RULE 53.—*Transportation of Corpses.*

SECTION 1. In no case will a corpse be received for transportation unless accompanied by a Physician's, Coroner's, or Board of Health certificate, also an undertaker's certificate that the body has been properly prepared for burial in accordance with Sections 2 and 4, Rule No. 52; nor will it be received, even with such certificates, if fluids are escaping from the case or it has become offensive in any degree. One first-class limited or unlimited ticket will be required for the transportation of a corpse without regard to the age of the deceased, and a corpse will not be received for transportation except there is a passenger with it in charge, and the word "corpse" plainly written on the face of a local ticket and on each coupon of a coupon ticket. All corpses forwarded must be billed and reported on station and train baggage way-bills and train reports, giving the name of deceased, destination, and number of permit.

SEC. 2. It will be the duty of agents to see that each burial case is properly marked on the paster, giving date and at what station shipped, point of destination, state, number, and form of ticket, name of passenger in charge and place of residence, with name of agent. If the corpse is destined to a point beyond this line, the initials of each road over which it passes must be written on the paster; also, the terminal point of each road at which transfer is made to connecting line, as shown on the coupons of the ticket.

SEC. 3. The personal effects of the deceased, if not contagious, to the amount of 150 pounds may be checked on the corpse ticket.

WOMEN AS CONSERVATORS OF THE PUBLIC HEALTH.*

BY HON. FRANK WELLS, PRESIDENT STATE BOARD OF HEALTH, LANSING.

Ladies of the Twentieth Century Club: I have been kindly asked by the director of the Home and Education department of the 20th Century Club to talk to you upon the subject of Women as Conservators of the Public Health. I thank you for this honor and for the privilege it gives me of calling the attention of so many of the more intelligent women of Detroit to a few of the recent revelations of science regarding those diseases which cause most sickness and deaths in the human family. The importance to women of these revelations cannot be overstated. It is upon them that the burden falls with the greatest weight when a member of their flock is stricken with illness and it is to their knowledge, judgment and care that conditions are maintained which prevent the enemies of life and health from gaining access to their homes In fitting herself to thus protect her home it is necessary for woman to keep abreast of the rapidly increasing sanitary knowledge of the day and with her quick intuitions to weave this knowledge into action. In keeping her own home free from the contaminating influence of disease and preventing it from becoming a center of infection, woman may do very much toward conserving the public health. How she may *best* do this requires upon her part a knowledge of the causes of that large and constantly widening class of diseases known as infectious and contagious. Especially is this true with regard to the two or three diseases most dangerous and most dreaded. While all communicable diseases have general characteristics in common and are to be combatted upon the general theory expressed by the words cleanliness, isolation and disinfection; yet there are many marked differences in the weapons and methods of attack peculiar to such diseases and in the means for defense against such attacks. I shall endeavor to outline this afternoon some of the features of this warfare, as they are thus far shown in its history and results, hoping that what I may say will be valuable to you largely as it may stimulate you to further study of this prolific, interesting and valuable branch of knowledge. It is not my purpose to endeavor to enlighten you concerning the treatment of the sick; this properly belongs to your physician. It is the more valuable ounce of prevention and not the pound of cure which I shall consider.

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*Read before the Twentieth Century Club of Detroit, Michigan, Jan. 9, 1896.

Twenty years ago when the whole scientific world was thrilled by the experiments of Pasteur in France, of Tyndall in England, and of Koch in Germany, the promise of their investigations was properly styled a theory of disease.

Today when these experiments have been verified by a host of investigators in the field of bacteriology no intelligent person familiar with these investigations, questions the fact that contagious diseases result from the action of minute organisms which in some way obtain access to the bodies of their victims. The theory of a decade ago is no longer a theory, for it has reached during this brief period to the dignity of a science.

This access to the body by these organisms is gained in four ways: By direct personal contact, by the air we breathe, by the food we consume, and by the water we drink. Knowledge of these foes of life and health, their work, methods and how they may be destroyed or avoided, constitutes the sanitary science of today. Nearly everything in this domain is recent knowledge. Previous to the time I speak of, there was much valuable empirical information regarding healthy and unhealthy conditions, but no such thing as sanitary science. People recognized the fact that there were unsanitary conditions; that those who lived amid filth and foul surroundings were much more disposed to contract certain diseases than those who were well ordered and cleanly. Why this was so or why the opposite of this sometimes held true, and the filthy lived out long lives while the cleanly were cut off in their youth, none could satisfactorily explain.

At the present time we *know* that all those diseases that we regard as contagious like diphtheria, small-pox, scarlet fever and many others are caused by living organisms and that filthy surroundings *alone* never cause these diseases. Such surroundings furnish the soil best adapted to the life and growth of disease organisms, but the organism of each specific disease *must* be planted in this soil before any of these diseases can be developed by it. As well look for a crop of wheat where no seed has been sown as for a crop of scarlet fever or diphtheria where the seeds of these diseases have not been planted. Filth is merely the nutritious soil ever ready to receive and vivify the seeds of disease and death. It cannot be necessary for me to state here that such soil in any of its forms should be banished from the presence of human habitations, and that in this important department women are especially the conservators of the public health.

The history of the discovery of microscopic organisms, and the important influence they exert both in inorganic and organic nature, though brief in point of time, is almost startling in the importance of its record. For the chemist, the physiologist, the sanitarian, the physician, and the student of nature, the new knowledge of this microscopic world possesses an interest and value far beyond any of the other discoveries of modern science.

The infinitesimal and varied organisms of which this history treats have been shown to be, in great measure, the means of life and the cause of death. Their potent influence is ever present, either for weal or woe. Without them the body would starve and yet they strike down as ruthlessly and as certainly as the assassin's dagger. Moving with us along the current of our existence, these "spirits of the air" are ever contending for our possession. Arrayed on one side are those co-operating with life and health to prolong our existence; upon the other, ten thousand foes assail and constantly seek some unguarded spot upon which to plant the insidious seeds of disease and death. But their work of destruction is no sooner accomplished than other myriads seize the stricken victim and prepare him again for life. In this way goes on forever a series of grand phenomena which owe their existence to the part performed by these creations which the unaided eye has never seen.

All that lives must die; and all that dies must be disintegrated and changed into the elements of which it was composed in order that it may be fitted to enter upon new cycles of life. This change we call fermentation, decomposition, putrefaction, and oxidation. A tree, a plant, or an animal falls and soon disappears. But whence has it gone, and *how?*

All the material from which this complex structure was composed came either directly or indirectly from inorganic nature, and must at death be returned to this same great source. Whether it be the modest violet or the lordly oak, the tiniest insect or man himself, the creation is formed of simple chemical elements arranged in a complex and unstable form, constantly undergoing change and decomposition.

As long as life continues these processes, to which we give many names are sustained by means of the lavish material which nature lends so liberally to her children. That she only lends, is a very old story. The manner by which she exacts a return of the last atom she has lent, is a new story. The old belief concerning this manner, accepted by chemists until within a recent period, held that the oxygen of the air communicated a molecular motion to particles of dead matter, which produced fermentation, and thus resolved them into new products, or into their original elements. The new belief, which is not now merely a belief, but a demonstrated fact, is that living organisms cause the ferments which produce these changes. In the words of a distinguished naturalist "A third kingdom has been discovered. The inhabitants of this kingdom are never idle. They leaven our bread, curdle our milk, cause our fruit to decay, addle our eggs, and decompose for new life the 'autumn leaves as they fall to enrich our mother earth.'"

The part played by these minute organisms in your homes is familiar to you all. They have by turns made you happy or miserable. You have been thankful for their presence when your bread has risen and deplored their absence when it has been heavy. Your butter, your cheese, and your vinegar, all owe their flavor to the changes wrought by them. These changes please you, but when similar organisms invade your meat, cause decay in your vegetables, or sour your cream, the feeling is usually different. A striking effect of the action of micro-organisms is seen in the fermentation of substances containing sugar and water in proper proportions. You all know that cider or the juice of grapes exposed to the air undergoes several changes. The sugar in these juices is attacked by living ferments and by means of their life processes changed into alcohol and carbonic acid. After the sugar has thus been all changed the organisms which it has served for pabulum die, and the alcohol produced by them becomes the prey of an invading army of another minute species, which changes this article into acetic acid or vinegar. While the alcohol lasts they flourish, but when they have exhausted it, these also perish. Each species has in turn used up all the food it could find suitable for its existence and, in doing so, has reduced a complex substance nearer to the simple elements from which it was composed. The chemist, in his laboratory, has not the power to make these changes for which we are dependent upon the action solely of these minute but powerful creations. Could the organisms of saccharine fermentation be obliterated, we would have no wine, beer or other alcoholic drinks and the prohibition party no existence.

The relation of some of these forms of life and the ferments they produce to disease, was early suspected by some, but believed in by only a few original investigators in Europe, whose names are now familiar to the world as the greatest benefactors of their race that any age can show. The story of the labor of Schwann, of Devaine, of Tyndall, of Pasteur, Koch, and a host of later laborers in the fields of enquiry which have rendered *them* famous, is familiar to you all and in the light of the knowledge those labors have revealed, the path which leads to success and victory is no longer the one of obscurity and doubt so dimly visible to these pioneers a decade or two ago.

It was known that measles, scarlet fever, small-pox and several other diseases could, in some way, be communicated by contact, and that one attack usually secured immunity from subsequent attacks.

Vaccination for small-pox had been proven to be efficacious, and that disease had largely ceased to menace the world with its horrors. Beyond this, science had scarcely taken a step in the direction of preventing or stamping out outbreaks of any of the communicable diseases, discovering their causes, or learning which of the diseases that afflict humanity belong properly to this class.

Scarcely a glimmer of the light that was soon to illumine these problems and create the twin sciences, sanitation and biology, was then visible. Revelations of the microscope concerning low forms of life were still regarded, even by scientific men, as curiosities of nature only.

All epidemic diseases, and several not regarded as belonging to this class, are now believed to owe their origin each to a specific *contagium vivum*. The characteristic organisms of most such diseases have already been discovered. Nearly all such discoveries have been verified by the application of Pasteur's rule, adopted by Koch, which is that the supposed causal micro-organism must be shown to be present in the blood or tissues of the person or animal affected with the disease; that this organism must be capable of cultivation in some suitable medium outside the body, and after having been so cultivated for several generations, must produce the same disease when introduced into the body of a healthy animal; finally in the body of this last as in the first animal the same parasite must be found.

I shall occupy a few moments with a brief description of the general characteristics of micro-organisms. An individual of this class may be regarded as a single cell of protoplasm. In the larger varieties portions of this protoplasm appear more highly refractive than others, and also exhibit minute granules. In the smaller varieties the contents of the cells seem homogeneous. They are found singly, in groups, and in the form of chains, and frequently exhibit cilia or hairlike appendages. Water is an indispensable element of their active life and development. Some seem to require oxygen for their existence, while others do not. Many of them withstand great varieties of temperature, but an average of about 95 Fahr. seems most generally favorable. Multiplication is accomplished by fission or a transverse division of the cells. The two resulting cells again divide, making four, and these again divide making eight. This continuing process is only limited by the failure of aliment for the formation of new protoplasm. Under favorable conditions, these divisions occur every hour, at which rate in 24 hours the appalling number of 16,777,220 will have been reached, and at the end of about a week the number can only be represented by 51 figures. Another method of multiplication is the formation of spores. This requires several stages. First, the body, recently itself developed from a spore stretches out rapidly, becomes partitioned with the parts either separating or remaining united in long filaments. Second, the parts increase sensibly in size. The third period exhibits the gradual formation in each link of a spherical or ovoid spore, highly refractive and having a dark outline. The protoplasm surrounding it disappears little by little, and the spore is set at liberty to again germinate under favorable circumstances. Micro-organisms, such as we have been considering are supposed to belong to the vegetable kingdom, and these spores are therefore true seeds. Micro-organisms vary in form, appearing as curved lines, dots, and rods. They are known under general names descriptive of these forms.

No place where human beings exist are free from these organisms. Air and water in their natural conditions are filled with them. We inhale them with every breath. They are more plentiful in homes and in cities and towns than in the open air of the country, while very high elevations like the tops of mountains are comparatively free from them.

The proportion of those unfriendly to health is very small indeed compared with those which are friendly.

Without them the highest forms of life would not long exist. They are the promoters of many of the processes of life and they are the scavengers after death. In considering those organisms which are the causes of disease, we are led to regard first their method of action; secondly, the channels by which they gain admission to the body; third, susceptibility of mankind and animals to their presence; and fourth, protective influences and tolerations. There are two classes of disease organisms, one called saprophytes and the other parasites. The former have their natural habitat outside the body of man or the lower animals, while the latter depend upon a living host for their existence and multiplication. The former become parasites when permitted to secure access to the bodies of suitable hosts. Among the saprophytes we may mention as typical the anthrax and the typhoid fever bacilli and the cholera spirilla; and among the parasites the bacilli of tuberculosis (consumption) and leprosy. Some of these organisms act indirectly as causes of disease through their influence upon certain foods such as milk, cheese, meats, etc.

Others invade the tissues of the body and multiply in favorable localities with great rapidity. Their destructive influence is accomplished in two ways. They produce local irritation, resulting in the formation of abnormal growths of low vitality and they take from the tissues certain elements for their life growth, leaving behind poisonous substances called toxins, which produce general constitutional disturbances.

The changes wrought by disease organisms upon living animal tissue are similar to the changes wrought by those of putrefaction upon dead tissue. The word ptomaine is used to describe the results of the action of micro-organisms upon non-living tissue and that of toxin to express generally the action of pathogenic organisms upon the living.

In pneumonia, for example, they produce local exudations which fill the air spaces of the lungs and, at the same time, evolve a toxic product which renders this disease so often fatal. In diphtheria the same conditions exist and the toxins secreted by the Klebs-Löffler bacillus, the cause of this disease, are usually far more potent than the local inflammation and change of tissue.

The channels by means of which disease organisms gain access to the body are external contact with infection, as in scarlet fever, measles, smallpox, etc.; external wounds as in tetanus, erysipelas, etc., and often anthrax, glanders, and some other diseases. But by far the most important channels are the alimentary canal and the respiratory organs. Typhoid fever is a typical and by far the most important disease of the alimentary tract. Drinking water, contaminated by sewage or cesspool leachings often contains bacilli which, under favorable conditions, invade the tissues of this portion of the body and produce this disease. Milk is an extremely favorable pabulum for these organisms and the disease is often contracted from this food where the cows producing it obtain their drinking water from a contaminated source. The tubercle bacillus (cause of consumption) frequently gains access to the body by means of milk or meat from tuberculous animals. The air we breath is an important channel for the communication of disease organisms. This air is laden more or less with dust held by it mechanically and commingled with this dust are myriads of micro-organisms. Right here, woman as a conservator of the public health, has an important responsibility resting upon her. This more or less dangerous dust is continually falling upon floors and as continually being stirred and kept in motion by that foe to health—the broom. A floor either carpeted or bare cannot be swept by an ordinary broom day after day without more or less danger from the dust which it puts in motion. The safe method for removing dust from floors is by means of damp cloths. While most of the organisms found in the dust of living rooms are harmless and against those which are not, the tissues of a healthy lung offer a resistance nearly always efficient, yet an inflamed condition of this or any other organ of the body in the presence of these foes may give them an opportunity to enter and begin their deadly work.

The susceptibility of certain individuals and species of animals and of mankind, to the influence of certain disease-producing organisms and the immunity of others from these influences are not only interesting peculiarities, but they are also facts of great practical value.

We know that many diseases like typhoid fever and cholera are common to man, but are not shared by the lower animals unless produced by inoculation.

On the other hand there are many diseases of these animals not found in man. Some diseases are common to man and *some* animals while *other* animals are immune. Tuberculosis, for example, is a disease of man, apes, cattle and some herbivorous animals, while carnivorous animals, as a rule, are not affected by this disease. Anthrax may be communicated to man from sheep, cattle, rabbits and mice, while dogs, rats, birds, and carniverous animals generally do not have it. Glanders, a horse disease, may be communicated to man, guinea pigs and field mice, while house mice, rabbits, cattle, and swine are practically immune. In addition to these peculiarities of different species we have similar peculiarities of individuals of the same species. As a rule, the young of all animals are more susceptible than the old. Thus, in mankind, it is the young who suffer from measles, scarlet fever, whooping-cough, and other children's diseases, even susceptibility to tuberculosis being greatly lessened after the age of forty.

Differences of susceptibility among adults is noticeable, where large numbers are equally exposed to contagium during an epidemic a portion only of whom will contract the disease. Family and race predispositions and immunity are quite noticeable. Thus the negro rarely suffers from yellow fever and among the whites those of the north are far oftener its victims than the inhabitants of tropical climes. On the other hand, the negro and other dark-skinned races are peculiarly susceptible to small-pox.

Evidently the essential difference between a susceptible and an immune animal is that in one the organism that causes a disease succeeds in invading the tissues and produces its characteristic effects while in the other it either fails to secure a lodgment entirely or its work is restricted to a limited local action. The condition of an animal or man, immune or non-susceptible to the action of a disease-producing organism, seems to be analogous to a substance which either does not contain the necessary aliment to sustain the life and promote the growth of such organism, or, like alcoholic or acetous fermentation, has already yielded all the aliment of this character it possessed.

Why do these conditions of resistance exist in some animals while they are absent in others? Nothing connected with bacteriology has caused more investigation, given rise to more discussion and produced more theories than has this question. The so-called Metchnikoff theory that the white corpuscles of the blood exercise their well known powers as scavengers and seize invading organisms,folding themselves about each one as the amœba folds itself about its food and thus restraining them has had many adherents. While this theory is plausible it does not satisfactorily account for all the phenomena involved. The question must still be regarded as unsettled. For the present, therefore, we must be contented with the facts which exist and utilize them as we may in the saving of life.

Considerations of these individual and race peculiarities has largely led to the numerous experiments having in view the discovery of protective methods and substances.

This brings us to our fourth view of the subject, protective influence and toleration.

It has been proved that immunity from certain diseases is not only inherent but that it may be acquired.

In the infectious diseases of man, with the exception of some which are local, a single attack usually protects from a subsequent attack. This fact holds true regarding the eruptive fevers, mumps, whooping-cough, typhoid fever and some others. The action of the organisms of these diseases has left products or made changes which has rendered the blood or tissues unfit for their further existence.

This does not seem to hold with cholera and epidemic influenza (la grippe) nor in local infectious diseases like diphtheria and erysipelas. While second attacks of small-pox, yellow fever, etc., do sometimes occur; they are usually in a very mild form and second attacks of diphtheria, cholera and la grippe rarely occur during the same epidemic. The immunity produced by an attack of these diseases continues for a brief period only. Immunity is secured by a mild attack as well as from a severe one and since the discovery of Jenner we have in small-pox vaccination immunity secured in this way from one disease by a very simple process.

These general facts have long been known and constituted the boundaries of our knowledge in this direction until Pasteur in 1880 succeeded in producing a mild form of a disease of poultry due to a micro-organism. An attenuated virus, rendered so by exposing strong cultures of the disease caused by this organism to the action of the air, rendered poultry inoculated by this culture immune to the disease. Pasteur's success with chicken cholera, and other diseases, finally led him to the study of the dread disease hydrophobia. The organism which logically is the cause of this malady has never been discovered, but Pasteur learned that the spinal cords of rabbits inoculated with this disease became in their entire substance as virulent as the material with which the animals were inoculated. The spinal cords, by exposure to dry air, could be reduced, he found, in virulence indefinitely, and thus attenuated be used to inoculate persons bit by rabid animals with such success that less than one per cent of persons thus treated died of hydrophobia. The method is to commence with a very weak virus and continue with those which are stronger until the patient can bear with impunity the strongest or one which at the beginning would have been fatal. This attenuated virus is a true vaccine and by its application the body is in some way rendered tolerant to that which possesses full and fatal power.

Closely following Pasteur's success in France Koch of Berlin, after discovering the organisms of Asiatic cholera and of tuberculosis, succeeded in isolating the toxin or poison due to the action of the bacillus tuberculosis. This substance which he named tuberculin, he hoped might prove a true vaccine for tuberculosis. Though his hopes of this were disappointed, yet his discovery is likely to prove of lasting benefit to mankind. Introduced under the skin of a human being or animal, tuberculin has little effect unless the person or animal is suffering from tuberculosis. When this is the case, a rise of three or four degrees of temperature always follows.

For this reason it is now relied upon for the diagnosis of this disease in cattle. The prevalence of consumption in cattle is much more extensive than was suspected before the discovery of this test. It prevails more largely in herds of high grade cattle than in those of lower grade. To the flesh of these animals and their milk may be attributed many of the otherwise obscure cases of tuberculosis which come under the observation of us all.

Results of investigations regarding the prevalence of this disease among herds in several of the states indicate that it exists much more extensively than had been anticipated. It was found that tests made in Vermont upon 941 animals contained in 90 herds 222 animals responded and were found to have the disease.

In Massachusetts of 866 head of cattle in 34 herds tested 243 or 28 per cent were killed as tuberculous and 189 more were looked upon with suspicion. Reports of 39 veterinarians representing 17 states show 549 cases of tuberculosis with 242 suspicious cases among herds containing about 3,000 animals. Calves, pigs and rabbits fed with milk from tuberculous cows acquire the disease in fully 40 per cent of the cases. These facts seem to reveal the cause of some at least of the obscure causes of the widespread prevalence of this disease in the human family. There certainly seems good reason to believe that much of the fatality among infants fed upon cow's milk is due to tuberculosis.

The danger from milk thus contaminated especially in cities like Detroit, where the milk supply comes usually from cows kept much of the time under conditions extremely favorable for the spread of this disease is very great. It will continue so until public opinion demands a law providing for the inspection, from time to time, of all herds of cows by competent inspectors. Danger from the use of flesh from tuberculous animals is greatly diminished if the heat of cooking is sufficient to destroy the organisms. Unless this is the case meat from tuberculous animals is dangerous. Such meat should always be thoroughly cooked. Even more important than this is the necessity for raising all milk from an uncertain source to a temperature of 180° before feeding it to infants.

Among the most promising results of experiments and investigations seeking for protective influences against the inroads of disease-producing organisms, are those which have been revealed in the employment of an immunized blood serum of the horse as an antitoxin for diphtheria. Thousands of tests of this substance have been made in hospitals and in the private practice of physicians, both in this country and in Europe, and its efficiency both as a preventive and as a remedy seems no longer a matter of doubt. It is obtained by injecting into the body of a horse, under the skin, a toxin developed by the action of the Klebs-Löffler bacillus, the cause of diphtheria, upon beef broth. Small doses about 2 c. c. of this toxin, are first injected. This is followed by a local swelling and a rise in temperature, but the horse does not seem to suffer very much. As soon as the swelling has disappeared and the temperature has receded a somewhat larger dose is given. This process is repeated until a time is reached when the largest doses produce no effect. This requires from six months to a year.

The animal is now said to be immune and this immunity may be transferred from it to a human being. Its blood under sanitary precautions is drawn, from time to time, by means of a rubber tube from the jugular vein into a proper receptacle and placed upon ice. The solid part, the clot, separates leaving the serum a limpid straw colored liquid. This is then placed in small vials for use. Though this serum for the treatment and prevention of diphtheria has been proven of the greatest value, yet it is a remedy to be used only by the physician.

It is one more evidence of the communicability of this disease, and that the Klebs-Löffler bacillus is its cause. The probable efficiency of this antitoxin should not cause us or the health officials of any city or town to relax their vigilance nor fail to use every effort to stamp out this terrible disease by the well known methods of isolation and disinfection.

The ravages of this disease have been far too large in the city of Detroit and I am glad to be able to attest the fact that the Detroit Board of Health are now taking the proper steps for a prompt diagnosis of this disease with a view to the adoption of the precautions for safety, isolation and disinfection, as soon as it is discovered. The most important disease, the one common to the whole country and the one which is said to be the cause of one-seventh of all the deaths of human beings in the civilized world, is now known to be a communicable and therefore a preventable disease. Its cause, the bacillus tuberculosis, infects homes, schools, churches, public halls, cars and in fact every place where human beings congregate. Sputum from the lungs of a tuberculous person deposited upon the floors of any of these places releases, upon drying, the organisms of the disease.

These remain upon the floors or may find a lodgment upon draperies, pictures, or furniture. These organisms belong to the class which under certain conditions form spores or seeds and, retaining their vitality for months, float in the air until they find a proper soil like an inflamed lung tissue where they may again begin their work of destruction.

About two years ago the Michigan State Board of Health declared consumption a disease dangerous to the public health, and required local health officers to report cases of this disease to its secretary in order that leaflets of instruction might be sent to the families and neighbors of the sufferers giving them the proper information to prevent if possible any further spread of the disease. It is not thought or considered necessary to isolate persons afflicted with consumption or to prevent them from attending to their usual avocations provided they take the proper measures to avoid becoming a menace to the health and lives of their neighbors and families. These measures consist in the destruction by fire of every particle of sputum coughed from the lungs, and in adopting the other precautions which experience as well as science declare to be necessary to insure safety.

One other important step has recently been taken for which the Michigan State Board of Health is largely responsible. This is the passage of an act by the legislature requiring that the elements of sanitary science shall be taught in all the public schools of the State. In the absence of any school text book containing this knowledge, the law provides that the publications of the Board shall be used for this purpose. Women are the teachers of our youth. The proportion of the children of our land who receive instruction from any other source, especially during their more tender years, is very small. The teachings of the mother are supplemented by those of the teacher in the public schools, who is nearly always a woman. The impressions made upon the minds of children during these early years remain usually through life. The responsibility of those who create these impressions is therefore very great. As conservators of public morals we know how well this responsibility has been met by woman. Without her teachings and examples, virtue, honor, and morality would be far more rare than they now are. What woman is doing for moral health she may and should do for physical health. She may teach by the fireside and in school the dangers that menace the body, and how they may be avoided. The act of the legislature requiring this kind of instruction to be given in the public schools, is a step in the right direction and it is gratifying to know that teachers are entering upon this work throughout the State with the greatest enthusiasm.

No other factor that can be named as a conservator of the public health can equal woman intelligently guarding her home from the noxious seeds of disease and death, and, in her proper sphere of mother and teacher, educating the coming generations of men and women in the knowledge of how their lives may be made healthy and happy and extended into years of usefulness.

[PART II.]

PRINCIPAL METEOROLOGICAL CONDITIONS IN MICHIGAN IN 1895.

COMPARISONS OF CONDITIONS IN 1895 WITH THOSE IN PRECEDING YEARS.

A COMPILATION OF REPORTS BY OBSERVERS FOR THE STATE BOARD OF HEALTH AND FOR THE UNITED STATES WEATHER BUREAU.

COMPILED UNDER THE DIRECTION OF THE SECRETARY OF THE MICHIGAN STATE BOARD OF HEALTH.

In the Annual Reports of this Board, there has been published for each of the years 1877 to 1894, inclusive, a summary relative to the principal meteorological conditions as observed during the year. This paper continues the subject for the year 1895. The names of the observers for that year, and the months in that year for which copies of registers of meteorological conditions were received from each, are stated in Exhibit 1. In Exhibit 2, is given the latitude, longitude, and elevation of each of these stations. In the tables which follow, reports received from any observer for less than half the year have not been used.

The principal conditions treated in the following tables are temperature, relative and absolute humidity of the air, cloudiness, fogs, rainfall, ground water levels, ozone, velocity and direction of the wind, and pressure of the atmosphere. The tables on each subject are illustrated by diagrams representing to the eye variations in the given condition from month to month through the year, at the several localities represented.

These tables give not only the meteorological conditions for the year and month under consideration, but they also contain, for purposes of comparison, statements of the average conditions for the longest period available in each case.

In the latter part of the Annual Report volume for 1886, there was published an article on "The Causation of Pneumonia," in which extensive use was made of meteorological statistics, especially those relating to the meteorology of Michigan. In the Annual Report for 1887, in an article on "The Causation of the Cold-weather Diseases," influenza, tonsillitis, bronchitis, scarlet fever, diphtheria, and small-pox are proved to sustain very close relations to meteorological conditions. Extensive use of meteorological and sickness statistics is made in the Report for 1887, in an article entitled "The Relations of Certain Meteorological Conditions to Diseases of the Lungs and Air-passages." In the Report for 1891, "Abstract of Proceedings, April 14, 1891," in a discussion on the subject of "The Causation of

Influenza," is an important use of the meteorological data, with diagrams and other evidence, showing how closely influenza is associated with atmospheric temperature, humidity, ozone and wind. In the Report for 1891, page cxxvii, is an article entitled "Relations of Certain Meteorological Conditions to Diseases of the Lungs and Air-passages in Colorado," in which are also data relative to other States and countries. In the Report for 1894, pages clix–ccxiv, is a paper on "The Causation of Influenza and Allied Diseases with Suggestions for their Prevention," in which important use is made of the meteorological data collected in Michigan since 1877. In each of the Annual Reports of this Board since that for the year 1877 considerable use has been made of the sickness statistics in Michigan for the complete study of which, data of the meteorological conditions coincident with the sickness is required.

EXHIBIT 1.—*Names of observers whose reports are summarized in the following Meteorological Tables and Diagrams, their places of observation, and the counties and geographical divisions of the State in which these places are situated, and months for which reports were received from each observer.*

Name of Observer.	Place of Observation.	County.	Division of the State.*	Months (inclusive) for which Registers were Received.
W. C. Gates, M. D.	Rockland	Ontonagon	U. P.	January to December.
Henry R. Patrick, Observer, U. S. Weather Bureau	Marquette	Marquette	U. P.	January to December.
C. L. Bozzell, Observer, U. S. Weather Bureau	Sault Ste. Marie	Chippewa	U. P.	January to December.
S. C. Wait	Traverse City	G'd Traverse	N. W	January to December.
H. McP. Baldwin, Observer, U. S. Weather Bureau	Alpena	Alpena	N. E.	January to November.
D. W. Mitchell, M. D	Harrisville	Alcona	N. E.	January to December.
Geo. W. Felger, Observer, U. S. Weather Bureau	Grand Haven	Ottawa	W.	January to December.
J. W. Ash	Ashton	Osceola	N. C.	January to November.
Wm. M. Edmondson, Observer, U. S. Weather Bureau	Port Huron	St. Clair	B. & E	January to December.
John S. Caulkins, M. D	Thornville	Lapeer	B. & E	January to December.
Prof. R. C. Kedzie	Agr'l College	Ingham	C.	January to December.
Wm. M. Force	Office State B'd of Health, Lansing	Ingham	C.	Jan. to Nov. 23.
Thos. S. Ainge	Office State B'd of Health, Lansing	Ingham	C.	Nov. 24 to Dec.
C. E. Beers	Adrian	Lenawee	S. C.	January to December.
Prof. Chas. E. Barr	Albion	Calhoun	S C.	Jan to May and Oct. to Dec.
Asaph Hall, Jr., Director Detroit Observatory	Ann Arbor	Washtenaw	S. C.	January to December.
J. H. Kellogg, M. D.	Battle Creek	Calhoun	S. C.	January to December.
Wm. M. Edwards, M. D., Supt. Asylum for Insane	Kalamazoo	Kalamazoo	S. C.	January to November.
Lewis Marvill	Parkville	St. Joseph	S. C.	January to December.
C. C. Tefft	Tecumseh	Lenawee	S. C.	January to December.
S. Alexander	Birmingham	Oakland	S. E.	January to December.
Edward A. Evans, Local Forecast Official, U. S. Weather Bureau	Detroit	Wayne	S. E.	January to May.
Norman B. Conger, Inspector, U. S. Weather Bureau	Detroit	Wayne	S. E.	June to December.

* The counties in each division are stated in Exhibit I. on a subsequent page.

The article in this Annual Report relative to "Causes of Diseases," based upon weekly reports of sickness in Michigan, may well be studied in connection with this article, the main purpose of which is to serve as a basis for studies of the causes of diseases.

It is believed that there is nowhere else so complete a statement of the facts relating to meteorology of Michigan as is here presented, for any use for which such knowledge may be needed, now or hereafter.

EXHIBIT 2.—*Latitude and Longitude, Elevation above Sea Level, and the Average Temperature, and Average Barometric Pressure in 1895, at Meteorological Stations in Michigan,—the names of the Stations being arranged in order by latitude, highest first.*

Localities in order of Latitude, those farthest North, first.	Latitude North.	Longitnde West from Greenwich.	Altitude (Approximate) above Sea Level.—Feet.	Height of Mercury in Cistern of Barometer above Sea Level.—Feet.	Average Temperature, 1895. Degrees Fahr.	Average Atmospheric Pressure, 1895. Inches of Mercury corrected for Temp.
Rockland	------------	------------	1,190.34	------------	------------	------------
Marquette	46°34′	87°24′	669.	------------	------------	------------
Sault Ste. Marie	46°28′	84°22′	642.	------------	------------	------------
Alpena	45°5′	83°3′	587.	------------	------------	------------
Traverse city	44°45′	85°40′	598.	605.	45.15	29.310
Harrisville	43°40′	83°30′	616.	------------	41.55	29.331
Ashton	43°58′	85°45′	700.	------------	------------	------------
Grand Haven	43°5′	86°18′	590.	------------	------------	------------
Port Huron	43°0′	82°26′	602.	------------	------------	------------
Thornville	* 42°55′	* 83°10′	§ 975.	§ 980.	46.75	28.942
Agricultural College	42°44′	84°29′	820.	834.	46.67	29.060
Lansing, S. B. of H.	† 42°44′	† 84°33′	¶ 900.	917.	46.74	29.078
Birmingham	42°30′	83°10′	‡ 752.	------------	47.67	29.083
Detroit	42°20′	83°3′	603.9	------------	------------	------------
Battle Creek	42°20′	85°11	800.	------------	48.37	------------
Kalamazoo	42°18′	85°37′	944.	------------	------------	------------
Ann Arbor	42°17′	83°44′	930.	936.	46.72	29.044
Albion	42°14′	84°45′	965.	985.75	------------	------------
Tecumseh	* 42°1′	* 83°57′	835.	840.	46.43	29.151
Adrian	41°53′	84°11′	770.	------------	47.62	29.125

* Estimated from lines on a map of Michigan, issued by the General Land Office, Department of the Interior, 1878. For stations having no reference mark, the latitude and longitude were stated by the observer on the meteorological reports received.

† The exact latitnde and longitude of the astronomical post placed in the ground near the new Capitol at Lansing, by the U. S. Lake Survey in 1875, as determined by the observations then made, is 42°43′ 53.11″ N. and 84°33′ 19.68″ W.

‡ Estimated from data on "Railroad Profiles," pages 179–187, Annual Report of the State Board of Health for 1878.

§ Estimated from data in Tackabury's Atlas of the State of Michigan.

¶ Estimated from comparisons of the barometrical observations at Lansing, Port Huron, and Grand Haven for the four years, 1879–82.

NOTE.—Green's standard barometer was used at the above stations for the year 1895.

EXHIBIT 3.—*Average Temperature by Year and Months, for each of the Years 1881–95, and the Average for the 18 Years, 1877–94. These Averages are for Groups of Several Stations in Michigan.*

Years, etc.	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 18 Yrs., '77-94	46.24	21.36	23.56	29.97	44.40	55.71	66.24	70.80	68.01	61.32	49.49	36.04	28.01
1881	47.22	14.93	19.75	29.36	40.53	62.72	63.32	72.95	71.76	67.99	51.87	37.42	34.03
1882	47.14	24.32	33.42	34.12	42.65	51.04	64.43	67.84	69.05	61.71	53.53	37.90	25.72
1883	43.52	15.78	20.03	24.63	43.00	51.37	64.73	68.36	65.41	57.24	46.73	38.10	26.89
1884	44.72	15.14	20.94	28.78	42.00	54.38	67.04	66.70	66.10	64.72	51.56	34.53	24.77
1885	42.36	15.46	10.21	19.51	41.39	53.32	63.39	71.13	63.23	59.14	45.78	38.14	27.59
1886	44.82	18.72	2[illegible].18	30.10	46.04	54.69	63.31	68.68	67.36	61.15	51.84	34.32	20.44
1887	44.82	16.58	21.57	25.55	42.09	60.68	66.53	73.22	66.41	57.95	44.46	35.18	25.57
1888	45.03	15.93	21.65	25.89	42.81	53.40	68.03	70.95	68.05	58.20	46.01	38.73	30.70
1889	47.36	28.18	18.57	35.83	46.04	56.74	63.05	70.69	68.58	61.36	44.59	37.95	36.76
1890	46.99	30.06	30.07	27.47	45.23	52.41	69.93	71.29	65.28	58.06	48.88	38.60	26.65
1891	47.61	26.90	27.33	28.93	47.11	55.40	67.62	66.67	68.16	65.50	49.01	34.57	34.11
1892	45.33	18.72	26.26	28.44	42.50	53.73	66.79	70.87	68.91	61.08	48.87	33.61	24.16
1893	54.64	15.23	20.09	30.61	43.19	54.30	69.05	72.16	68.57	60.40	50.59	36.61	26.88
1894	48.49	27.19	22.37	38.70	46.90	55.24	70.37	73.30	68.74	64.45	50.14	33.09	31.40
1895	46.37	19.04	17.27	27.39	47.23	59.49	70.60	70.10	70.11	65.92	44.54	36.03	28.68

EXHIBIT 4.—*Average Temperature by Year and Months, for each of the Years 1879–95, and the Average for the 16 Years, 1879–94, at the Office of the State Board of Health, State Capitol, Lansing, Michigan.*

Years, etc.	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 16 Yrs., '79-94	47.27	22.21	24.30	31.51	46.05	57.67	68.03	72.07	68.56	61.68	50.10	36.58	28.46
1879	48.87	21.78	22.49	36.27	47.54	60.88	67.71	75.86	70.05	58.11	59.50	38.22	27.46
1880	48.94	36.81	31.62	34.19	47.46	65.48	69.44	71.69	70.38	61.19	48.64	28.78	21.65
1881	49.59	16.98	22.27	30.59	43.23	66.94	65.99	75.41	74.63	71.33	53.63	38.78	35.28
1882	49.23	25.65	35.88	36.14	44.83	53.10	66.86	72.57	71.34	63.64	55.63	39.00	26.13
1883	45.69	17.01	22.07	28.04	46.42	58.28	66.98	70.42	67.78	59.42	48.31	40.09	28.47
1884	47.43	16.48	23.89	32.26	45.30	58.20	70.69	69.77	68.58	67.99	53.47	36.51	26.01
1885	43.01	15.85	10.49	21.57	43.97	55.71	65.26	73.35	63.28	55.86	45.43	38.21	27.14
1886	46.19	19.02	22.44	32.09	50.16	57.77	66.20	70.87	68.49	61.81	51.78	34.02	19.61
1887	46.69	18.26	24.39	27.81	45.27	64.24	69.44	75.76	67.06	58.66	45.19	36.59	27.63
1888	45.49	15.63	22.38	27.49	44.30	53.91	68.80	71.09	67.77	57.79	46.32	39.16	31.19
1889	47.65	29.00	18.89	36.81	46.91	56.99	63.36	70.59	68.46	61.32	44.39	37.71	37.31
1890	47.89	31.63	31.51	28.53	46.86	53.94	71.03	71.81	65.38	57.97	49.09	39.46	27.46
1891	48.27	27.74	29.13	29.59	48.12	56.01	68.27	66.84	68.20	65.87	49.39	34.80	35.23
1892	46.33	19.94	27.91	30.15	44.68	54.91	68.22	71.41	68.59	61.43	49.27	34.11	25.34
1893	46.03	15.09	20.68	32.19	43.98	55.20	69.14	72.14	68.47	60.22	51.19	36.40	27.70
1894	49.00	28.56	22.70	40.48	47.77	56.20	71.04	73.59	67.84	64.21	50.39	33.41	31.78
1895	46.74	18.91	16.98	27.92	48.66	60.52	71.56	70.35	70.20	65.88	44.44	35.86	29.55

EXHIBIT 5.—*Average Temperature by Year and Months, for each of the Years 1864–95, and the Average for the 31 Years, 1864–94, at the Agricultural College, Michigan.*

Years, etc.	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 31 Yrs., '64-94	46.51	21.90	23.82	31.03	45.76	57.64	67.70	71.34	68.55	60.42	48.24	35.44	26.48
1864	47.32	22.26	27.32	31.74	45.86	60.19	67.62	74.52	70.72	59.62	45.74	37.88	24.27
1865	48.12	21.10	27.59	39.96	47.40	57.65	70.76	65.60	65.84	67.66	46.50	38.63	27.72
1866	45.60	21.16	22.71	29.60	48.94	55.04	66.60	71.72	62.60	55.80	49.50	37.94	25.53
1867	46.91	17.61	30.89	29.72	48.20	51.11	71.61	71.60	69.78	56.60	50.60	40.44	25.31
1868	46.34	19.00	18.72	37.80	43.68	59.08	68.46	77.19	70.33	58.77	45.19	36.77	21.16
1869	46.27	29.38	26.66	27.60	45.70	56.02	64.45	70.35	70.58	63.45	40.80	32.05	28.16
1870	49.11	25.37	24.25	30.28	50.39	64.32	70.87	74.40	70.11	63.66	52.45	38.40	24.80
1871	47.93	24.75	25.65	38.18	50.13	61.39	68.21	70.60	71.19	58.10	53.91	31.95	21.12
1872	45.54	21.59	21.34	24.75	47.39	58.48	71.82	74.91	71.22	62.03	47.44	29.80	15.74
1873	44.54	15.87	19.10	28.30	43.17	56.98	70.60	70.82	69.49	57.38	44.68	28.49	29.54
1874	47.05	27.70	25.51	32.30	36.87	59.58	70.61	70.02	69.39	62.85	49.10	35.00	26.96
1875	43.06	12.87	7.99	26.20	41.11	60.82	66.57	69.67	65.48	58.50	42.93	32.96	31.58
1876	46.17	30 22	27.38	30.55	44.16	57.95	68.14	72.48	71.55	56.30	43.74	36.33	15.23
1877	47.42	18.07	32.31	24.51	46.16	58.25	65.93	71.43	68.46	61.28	50.83	35.24	36.57
1878	48.29	29.11	28.07	40.90	50.55	54.57	64.08	73.04	70.15	63.15	48.33	36.29	21.29
1879	46.88	19.19	20.40	33.19	44.84	58.76	66.02	74.03	70.00	56.21	57.28	38.22	27.46
1880	47.32	37.10	29.19	35.50	45.87	64.30	67.60	68.04	68.58	55.83	46.23	27.52	22.07
1881	48.73	16.98	21.58	30.28	45.59	65.24	64.31	73.43	72.69	69.69	52.51	38.20	34.31
1882	47.57	24.89	35.12	35.96	44.70	52.73	66.49	67.71	69.52	59.98	52 67	36.30	24.80
1883	43.52	14.39	19.76	24.89	43.48	52.98	65.87	68.94	64.90	56.43	46.17	38.08	26.39
1884	45.66	15.46	23.43	29.89	43.66	56.90	68.92	67.95	66.91	65.06	50.91	34.11	24.71
1885	42.90	15.34	8 94	21.26	43.59	55.76	64.69	72.70	63.62	58.94	44.95	37.22	27.75
1886	46.20	18.78	22.27	31.33	50.18	58.06	65.72	70.68	69.30	62.07	52.37	33.94	19.74
1887	46.60	18.20	24.26	28.29	45.37	64.28	68.53	75.51	67.96	58.86	44.97	35.66	27.30
1888	45.03	15.40	21.95	27.03	44.03	53.65	67.89	70.53	67.55	57.76	45.70	38.50	30.39
1889	47.33	28.04	18.25	36.51	46.59	57.37	62.83	70.19	68.56	61.24	44.19	37.39	36.75
1890	47.60	31.54	31.54	28.15	47.08	53.69	70.40	71.04	65.42	57.76	49.11	39.06	26.45
1891	47.38	26.70	26.60	29.30	47.40	55.70	67.40	65.30	67.90	65.10	48.80	33.90	34.50
1892	45.88	19.19	27.30	29.86	44.50	54.50	67.70	70.29	68.30	60.80	48.30	34.20	25.59
1893	44.98	14.80	21.31	28.16	43.50	54.40	66.60	71.50	68.10	58.41	49.70	35.63	27.60
1894	48.58	26.88	21.15	40.06	48.44	56.94	71.38	73.22	68.80	63 66	49.80	32.48	30.12
1895	46.67	17.50	16.40	27.20	48.57	61.80	71.40	70.50	71.20	66.60	45.00	35.40	28.50

EXHIBIT 6.—*Statements of Meteorological Conditions in the year and in each month of the year 1895, compared with the annual and monthly averages for 1894, and for several stated periods of years. These statements and averages are for* **Groups of Several Stations in Michigan.**

Meteorological Conditions.	1895 Compared with Averages for Previous Years.		In 1895 More (+), or Less (—), than in 1894.
	No. of Years Averaged, end'g with 1894.	More (+), or Less (—), in 1895 than the Average for Previous Years.	
Year 1895.			
Av. Temp.	18	+.13°	—2.12°
Range of Temp.*	18	+2°	—2°
Av. Monthly Range of Temp.*	18	+4°	—1°
Av. Daily Range of Temp.*	16	+1.18°	+1.34°
Year 1895. *Continued.*			
Cloudiness	18	—6 per ct.	—4 per ct.
Rainfall	18	—8.02 in.	—1.68 in.
Atmospheric Pressure	18	—.012 in.	+.072 in.
January.			
Av. Temp.	18	—2.33°	—8.15°
Range of Temp.*	18	—12°	—7°
Av. Daily Range of Temp.*	16	—.52°	+.79°
Cloudiness	18	—2 per ct.	0
Rainfall	18	+.74 in.	+1.18 in.
Atmospheric Pressure	18	—.114 in.	—.032 in.
February.			
Av. Temp.	18	—6.29°	—5.10°
Range of Temp.*	18	+6°	=
Av. Daily Range of Temp.*	16	—1.23°	—.83°
Cloudiness	18	—8 per ct.	0
Rainfall	18	—1.82 in.	—.94 in.
Atmospheric Pressure	18	—.040 in.	+.039 in.
March.			
Av. Temp.	18	—2.58°	—1.31°
Range of Temp.*	18	+7°	—10°
Av. Daily Range of Temp.*	16	+1.18°	+1.90°
Cloudiness	18	—10 per ct.	—7 per ct.
Rainfall	18	—1.29 in.	—1.12 in.
Atmospheric Pressure	18	—.014 in.	+.077 in
April.			
Av. Temp.	18	+2.83°	+.33°
Range of Temp.*	18	—10°	—6°
Av. Daily Range of Temp.*	16	+.79°	+2.04°
Cloudiness	18	—4 per ct.	—6 per ct.
Rainfall	18	—1.09 in.	—.95 in.
Atmospheric Pressure	18	+.005 in.	+.061 in.
May.			
Av. Temp.	18	+3.78°	+4.25°
Range of Temp.*	18	+6°	+4°
Av. Daily Range of Temp.*	16	+2.27°	+4.21°
Cloudiness	18	—7 per ct.	—16 per ct.
Rainfall	18	—.59 in.	—3.48 in.
Atmospheric Pressure	18	+.042 in.	+.140 in.
June.			
Av. Temp.	18	+4.36°	+.23°
Range of Temp.*	18	—1°	+1°
Av. Daily Range of Temp.*	16	+3.64°	+1.41°
Cloudiness	18	—12 per ct.	—5 per ct.
Rainfall	18	—2.51 in.	—1.42 in.
Atmospheric Pressure	18	+.092 in.	+.149 in.

* By registering thermometers.

Comments on Exhibit 6 are printed on page 10.

The low temperature for February, and the small amount of rainfall for the year 1895, are especially noticeable.

EXHIBIT 6.—CONTINUED.—*Meteorological Conditions at stations in Michigan, in months for the year 1895, compared with averages for corresponding months in preceding years.*

Meteorological Conditions.	1895 Compared with Averages for Previous Years.		In 1895 More (+), or Less (—), than in 1894.	Meteorological Conditions.	1895 Compared with Averages for Previous Years.		In 1895 More (+), or Less (—), than in 1894.
	No. of Years Averaged, end'g with 1894.	More (+), or Less (—), in 1895 than the Average for Previous Years.			No. of Years Averaged, end'g with 1894.	More (+), or Less (—), in 1895 than the Average for Previous Years.	
JULY.				AUGUST.			
Av. Temp.	18	—.70°	—3.20°	Av. Temp.	18	+2.10°	+1.37°
Range of Temp.*	18	+4°	—2°	Range of Temp.*	18	+1°	—2°
Av. Daily Range of Temp.*	16	+2.55°	+.43°	Av. Daily Range of Temp.*	16	+1.53°	—1.23°
Cloudiness	18	+11 per ct.	+16 per ct.	Cloudiness	18	—4 per ct.	—5 per ct.
Rainfall	18	—1.54 in.	+.17 in.	Rainfall	18	+.24 in.	+2.51 in.
Atmospheric Pressure	18	+.011 in.	+.062 in.	Atmospheric Pressure	18	—.062 in.	—.005 in.
SEPTEMBER.				OCTOBER.			
Av. Temp.	18	+4.60°	+1.47°	Av. Temp.	18	—4.95°	—5.60°
Range of Temp.*	18	+6°	—1°	Range of Temp.*	18	+6°	=
Av. Daily Range of Temp.*	16	+.92°	+.45°	Av. Daily Range of Temp.*	16	+1.54°	+2.88°
Cloudiness	18	—6 per ct.	—3 per ct.	Cloudiness	18	—13 per ct.	—20 per ct.
Rainfall	18	—.58 in.	—.60 in.	Rainfall	18	—2.03 in.	—1.58 in.
Atmospheric Pressure	18	—.041 in.	+.047 in.	Atmospheric Pressure	18	—.002 in.	+.191 in.
NOVEMBER.				DECEMBER.			
Av. Temp.	18	—.01°	+2.94°	Av. Temp.	18	+ 67°	—2.72°
Range of Temp.*	18	+5°	+5°	Range of Temp.*	18	+20°	+3°
Av. Daily Range of Temp.*	16	+1.16°	+2.60°	Av. Daily Range of Temp.*	16	+ 40°	+1.51°
Cloudiness	18	—4 per ct.	—8 per ct.	Cloudiness	18	—1 per ct.	+10 per ct.
Rainfall	18	+.38 in.	+1 46 in.	Rainfall	18	+2.05 in.	+3.10 in.
Atmospheric Pressure	18	+.054 in.	+.141 in.	Atmospheric Pressure	18	—.081 in.	—.010 in.

* By registering thermometers.

EXHIBIT 7.—*Statements of Meteorological Conditions in the year and in each month of the year 1895, compared with annual and monthly averages for 1894, and for several stated periods of years—from observations by Prof. R. C. Kedzie,* at the **State Agricultural College, near Lansing, Michigan.**

Meteorological Conditions.	1895 Compared with Averages for Previous Years.		In 1895 More (+), or Less (—), than in 1894.	Meteorological Conditions.	1895 Compared with Averages for Previous Years.		In 1895 More (+), or Less (—), than in 1894.
	No. of Years Averaged, end'g with 1894.	More (+), or Less (—), in 1895 than the Average for Previous Years.			No. of Years Averaged, end'g with 1894.	More (+), or Less (—), in 1895 than the Average for Previous Years.	
YEAR 1895.				YEAR 1895.			
Av. Temp.	31	+.16°	—1.91°	*Continued.*			
Range of Temp.*	22	+12°	+4°	Cloudiness	31	—7 per ct.	—5 per ct.
Av. Monthly Range of Temp.*	22	+9°	+2°	Rainfall	31	—8.25 in.	+3.50 in.
Av. Daily Range of Temp.*	21	+6.03°	+3.81°	Atmospheric Pressure	20	—.006 in.	+.022 in.
JANUARY.				FEBRUARY.			
Av. Temp.	31	—4.40°	—9.38°	Av. Temp.	31	—7.42°	—4.75°
Range of Temp.*	22	—9°	—20°	Range of Temp.*	22	+13°	+8°
Av. Daily Range of Temp.*	21	+7.58°	+.35°	Av. Daily Range of Temp.*	21	+1.64°	+.68°
Cloudiness	31	—6 per ct.	+2 per ct.	Cloudiness	31	+1 per ct.	+8 per ct.
Rainfall	31	—.74 in.	—.33 in.	Rainfall	31	—1 87 in.	—.41 in.
Atmospheric Pressure	20	—.120 in.	—.034 in.	Atmospheric Pressure	20	—.081 in.	—.024 in.
MARCH.				APRIL.			
Av. Temp.	31	—3.83°	—12.86°	Av. Temp.	31	+3.81°	+.13°
Range of Temp.*	22	+21°	+15°	Range of Temp.*	22	+2°	+3°
Av. Daily Range of Temp.*	21	+3.37°	+4.59°	Av. Daily Range of Temp.*	21	+5 96°	+7.30°
Cloudiness	31	—7 per ct.	—9 per ct.	Cloudiness	31	—7 per ct.	—12 per ct.
Rainfall	31	—2.11 in.	—.98 in.	Rainfall	31	—1 77 in.	—2.09 in.
Atmospheric Pressure	20	+.013 in.	+.043 in.	Atmospheric Pressure	20	+.006 in.	—.006 in.
MAY.				JUNE.			
Av. Temp.	31	+4.16°	+4.86°	Av. Temp.	31	+3.70°	+.02°
Range of Temp.*	22	+5°	+6°	Range of Temp.*	22	+12°	=
Av. Daily Range of Temp.*	21	+4.00°	+6.01°	Av. Daily Range of Temp.*	21	+2.68°	+5.70°
Cloudiness	31	—5 per ct.	—16 per ct.	Cloudiness	31	—10 per ct.	—2 per ct.
Rainfall	31	—1.21 in.	—2.77 in.	Rainfall	31	—2.98 in.	—.29 in.
Atmospheric Pressure	20	+.055 in.	+.098 in.	Atmospheric Pressure	20	+.097 in.	+.099 in.

* By registering thermometers.

Comments on Exhibit 7 are printed on page 10.

The low temperature for February, and the small amount of rainfall for the year 1895, are especially noticeable.

EXHIBIT 7.—CONTINUED.—*Meteorological Conditions at the Agricultural College in months, for the year 1895, compared with averages for corresponding months in preceding years.*

Meteorological Conditions.	1895 Compared with Averages for Previous Years.		In 1895 More (+), or Less (—), than in 1894.	Meteorological Conditions.	1895 Compared with Averages for Previous Years.		In 1895 More (+), or Less (—), than in 1894.
	No. of Years Averaged, end'g with 1894.	More (+), or Less (—), in 1895 than the Average for Previous Years.			No. of Years Averaged, end'g with 1894.	More (+), or Less (—), in 1895 than the Average for Previous Years.	
JULY.				AUGUST.			
Av. Temp.	31	—.84°	—2.72°	Av. Temp.*	31	+2.65°	+2.40°
Range of Temp.*	22	+14°	—3°	Range of Temp.*	22	+6°	—16°
Av. Daily Range of Temp.*	20	+10.33°	+.53°	Av. Daily Range of Temp.*	21	+7.12°	—1.39°
Cloudiness	31	+1 per ct.	+16 per ct.	Cloudiness	31	—4 per ct.	—1 per ct.
Rainfall	31	—1.57 in.	+.61 in.	Rainfall	31	+1.93 in.	+4.64 in.
Atmospheric Pressure	20	+.021 in.	+.025 in.	Atmospheric Pressure	20	—.049 in.	—.048 in.
SEPTEMBER.				OCTOBER.			
Av. Temp.	31	+6.18°	+2.94°	Av. Temp.	31	—3 24°	—4.80°
Range of Temp.*	22	+9°	—4°	Range of Temp *	22	+3°	+1°
Av. Daily Range of Temp.*	21	+7.12°	+5.03°	Av. Daily Range of Temp.*	21	+5.38°	+4.23°
Cloudiness	31	—15 per ct.	—13 per ct.	Cloudiness	31	—17 per ct.	—26 per ct.
Rainfall	31	—1.94 in.	—1.74 in.	Rainfall	31	—1.09 in.	—.50 in.
Atmospheric Pressure	20	+.031 in.	+.042 in.	Atmospheric Pressure	20	—.005 in.	+.089 in.
NOVEMBER.				DECEMBER.			
Av. Temp.	31	—.04°	+2.92°	Av. Temp.	31	+2 02°	—1.62°
Range of Temp.*	22	+13°	+12°	Range of Temp.*	22	+24°	+17°
Av. Daily Range of Temp.*	21	+6 97°	+8 03°	Av. Daily Range of Temp.*	21	+4 97°	+4 62°
Cloudiness	31	—4 per ct.	—11 per ct.	Cloudiness	31	—4 per ct.	+2 per ct.
Rainfall	31	+1.62 in.	+2.90 in.	Rainfall	31	+3.51 in.	+4.46 in.
Atmospheric Pressure	20	+ 032 in.	+.053 in.	Atmospheric Pressure	20	—.083 in.	—.080 in.

* By registering thermometers.

METEOROLOGICAL CHARACTERISTICS OF THE YEAR 1895 IN MICHIGAN.

At the several meteorological stations, in different parts of the State, the average temperature for 1895 was .13° higher than the average for the preceding 18 years; the annual range of temperature was 2° less than in 1894 and 2° greater than the annual range for the preceding 18 years; the average monthly range of temperature was 1° less than in 1894 and 4° greater than the average for the preceding 18 years; the average daily range of temperature was 1.34° greater than in 1894, and 1.18° greater than the average for the preceding 16 years; the average cloudiness was 4 per cent less than in 1894, and 6 per cent less than the average for the preceding 18 years: the rainfall (rain and melted snow) was 1.68 inches less than in 1894, and 8.02 inches less than the average for the preceding 18 years; the average atmospheric pressure was .072 of an inch greater than in 1894, and .012 of an inch less than the average for the preceding 18 years.

In Exhibit 6, is given by year and months, a comparison of conditions in 1895, in Michigan, with those in 1894, and with the averages of periods of years. Naming the months in the order of greatest difference, September, June, May, April, August and December, were the months in which the average temperature in 1895 was higher than the average for corresponding months in the preceding 18 years; February, October, March, January, July and November were months in which the average temperature in 1895 was lower than the average for corresponding months in the preceding 18 years.

METEOROLOGICAL CHARACTERISTICS OF THE YEAR 1895 AT ONE CENTRAL STATION.

At the State Agricultural College, near Lansing, and near the center of the thickly-settled part of the State, the average temperature for 1895 was 1.91° lower than in 1894, and .16° higher than the average for the preceding 31 years; the annual range of temperature was 4° greater than in 1894, and 12° greater than the average for the preceding 22 years; the average monthly range of temperature was 2° greater than in 1894, and 9° greater than the average for the preceding 22 years; the average daily range of temperature was 3.81° greater than 1894, and 6.03° greater than the average for the preceding 21 years; the average cloudiness was 5 per cent less than in 1894, and 7 per cent less than the average for the preceding 31 years; the rainfall (rain and melted snow) was 3.50 inches greater than in 1894, and 8.25 inches less than the average for the preceding 31 years; the average atmospheric pressure was .022 of an inch greater than in 1894, and .006 of an inch less than the average for the preceding 21 years.

In exhibit 7, is given by year and months, a comparison of conditions in 1895, at the Agricultural College, with those in 1894, and with averages for periods of years. Naming the months in the order of greatest difference, September, May, June, April, August and December, were months in which the average temperature in 1895 was higher than the average for corresponding months in the preceding 31 years; February, January, March, October, July and November were months in which the average temperature in 1895 was lower than the average for corresponding months in the preceding 31 years, at that station which is near the central part of the State.

Whoever will carefully study Diagram I. in this article, and in similar articles for preceding years, will see that thermometers and methods of observation have become so perfect that, given a curve representing correctly the temperature by months at one station in Michigan, curves can readily be constructed without actual records, which will somewhat closely represent the temperature at each of several other stations, because the curves for many stations run so nearly parallel that all that is necessary to do is to find the average difference of mean annual temperature at the station to be represented compared with the station for which the data are given. It may also be seen that a curve representing the temperature at a station in the central part of the State very closely resembles the curve representing the average for many stations representing nearly all parts of the State. This proves that the practice adopted many years ago of stating the meteorological characteristics at one central station is a reasonably safe practice, and it is especially useful when it enables us to gain a comparison for a longer period than can be made from records at many stations, and also when employed in advance of the receipt of records from all stations, as is the case when the weekly bulletins of "Health in Michigan" are issued, for the purposes for which the meteorological conditions at the State Capitol are used to represent the conditions probably prevailing throughout the State.

LOCAL METEOROLOGICAL PHENOMENA IN THE SEVERAL MONTHS OF THE YEAR 1895.

The following general remarks relative to temperature, frosts, effects on vegetation, migration of birds, etc., in 1895, are taken from the monthly reports by observers. The names of stations are appended; the names of observers are stated in Exhibit 1.

JANUARY.

Depth of snow on ground, 2 ft. Jan. 15; Jan. 31, 3 ft —*Rockland.*

Depth of snow on ground, 31.7 inches, Jan. 15; Jan. 31, 45.4 inches.—*Marquette.*

A cold stormy month; heavy snowfall, good sleighing the latter half. Much high winds have drifted the roads up badly. Ice is a foot or more on the ponds—not so much in the earth where the snow lies. Water in wells and streams is low.—*Thornville.*

Depth of snow on ground, 10¾ inches, Jan. 15; Jan. 31, 3 inches —*Adrian.*

Depth of snow on ground 10 inches, Jan. 15; Jan. 31, 10 inches.—*Lansing.*

FEBRUARY.

Depth of snow on ground, 35.8 inches, Feb. 15; Feb. 28, 21.7 inches.—*Marquette.*

Melting snow on ground, Feb. 24, 25, 26 27, 28.—*Grand Haven.*

A cold, dry, windy month. Good sleighing on east and west roads. North and south roads are generally drifted full. The ground in the open is frozen three or four feet deep. Many cellars have frozen and probably potatoes in pits. There was never a time since windmills began to be used, that so many were made useless by frost. As the month closes the snow has nearly disappeared from the open but it is deep in the woods. It is too early to decide on the peach buds. Wheat is all right yet.—*Thornville.*

Depth of snow on ground, 4 inches, Feb. 15; Feb. 28, none.—*Adrian.*

Robins and blue jays seen, Feb. 25. Rain fell to-day after 48 days of continued sleighing.—*Kalamazoo.*

No rainfall or snowfall in February.—*Birmingham.*

Depth of snow on ground, 6 inches, Feb 15; Feb. 28, a little snow on ground in patches, where it had drifted.—*Lansing.*

Bees were out on Feb. 16, 25, 28. Blue jays were seen on Feb. 27.—*Parkville.*

MARCH.

Depth of snow on ground, 20.7 inches, Mar. 15; Mar. 31, 4 inches.—*Marquette.*

Melting snow on ground Mar. 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 25, 26, 27. Lake and river frozen during month.—*Port Huron.*

Did not freeze at night, Mar. 24. Hawk seen, Mar. 2. Killdeer and blue birds seen, Mar. 22.

March was a cold dry winter month, colder by 6 or 7 degrees than the normal. As it closes, the frost is yet in the ground very deep—so deep that pipes of the windmills that froze up during the winter (and that includes nearly everybody's) still remain frozen. Wheat has come through the winter very well—does not seem much winter-killed. Peach buds except in sheltered places are badly hurt. All other fruit buds are all right.—*Thornville.*

Frost about out of ground, March 31.—*Battle Creek.*

Killing frosts, Mar. 21, 22, 23, 24, 25, 27, 28.

Robins appeared. March 1. Blackbirds appeared, March 24. Total eclipse of moon, March 10, evening. Depth of snow on ground Mar. 15, a little in patches where it had drifted. No snow on ground March 31. Grand River clear of ice at this station, Mar. 30.—*Lansing.*

Robins seen, Mar. 1. Bees were out, Mar. 18, 21, 27, 29. Wild geese seen, Mar 19. The month has been unusually cold with hard freezing.—*Parkville.*

APRIL.

Ice went out of Ontonagon River the first week of this month This month has been remarkably warm and clear.—*Rockland.*

Open navigation, April 29. Trace of snow on ground, April 15; April 30, none.—*Marquette.*

Killing frost, Apr. 18. Light frosts, Apr. 24, 25, 26, 28. Lake and river filled with heavy, floating ice during entire month. Navigation on St. Clair River opened Apr. 5. Navigation on Lake Huron open, Apr. 7.—*Port Huron.*

Nights that did not freeze, Apr. 5, 6, 7, 11. Frogs first heard, Apr 5. Willow blossom, Apr. 24. Elm and Hazel blossom, Apr. 26. Dandelions blossom, Apr. 30. Catbirds return, Apr. 30.—*Thornville.*

Robin first seen, Apr. 10. Frogs heard, Apr. 11. Wild flowers in bloom, Apr. 19. Cowslips budding and trees leafing, Apr. 22. Violets in bloom, Apr. 26. Cherry in blossom and apples budding, Apr. 30.—*Battle Creek.*

Wild geese flying south, Apr. 4. Wild geese flying north, April 5. Crows seen, Apr. 6.—*Kalamazoo.*

Killing frosts, Apr. 3, 4, 5, 10, 11, 15, 16, 22, 23. Light frosts, Apr. 18, 19, 20. First butterfly of season, large, nearly black, seen, Apr. 4; Phoebe birds appeared, Apr. 5; song sparrows, Apr. 4; meadow larks and blue birds, Apr. 8. Soft maples budded, Apr. 8; Elms, Apr. 10. Ground froze, Apr. 10, 11. Frost out of ground Apr. 8.—*Lansing.*

Frosts, Apr. 2, 3, 4, 5, 10, 11, 15, 19, 20, 22.—*Parkville.*

MAY.

Light frost, May 11. Ice formed an inch thick in wash tubs, May 12.—*Rockland.*

Light frosts May 14, 15, 16, 23. Killing frost, May 21.—*Sault Ste. Marie.*

Light frosts, May 15, 17. Killing frosts, May 12, 16, 20, 21.—*Grand Haven.*

During the 10 days, ending with May 6, vegetation has grown more rapidly, than for the corresponding period of time, in our remembrance, for the past 65 years. Trees in leaf and fruit trees in bloom, May 9. Froze quite hard during night of May 12,—fruit damaged. Frosts, May 7, 8, 9, 10, 11, 12, 13, 14,—killed all the fruit and tender vegetables. Rye considerably damaged.—*Ashton.*

Killing frosts May 13, 15, 16, 21. Light frosts, May 3, 6, 7, 8, 10, 11.—*Port Huron.*

Frosts, mornings of May 15, 16, 17, 21—killed all tender vegetation. Apple trees leafing, May 1. June berry in blossom, May 2. Apple trees in blossom, May 7. Oaks leafing, May 8.

Barn swallows return, May 2. Yellow-birds return, May 7. Bobolinks return, May 9. Cuckoos return, May 24.

The month was one of extremes—hot for the season at first—almost corn weather—then as much too cold—almost wintery and closing with some very hot days—far too hot for the season. The frosts of the mornings of May 15, 16, 17, 21, were heavy and did much damage, all tender vegetation being killed. There was no corn up to be hurt, but some early potatoes were, and were frozen. Strawberries and grapevines are hurt—badly used up. On low grounds clover is hurt. Peaches, though called tender fruit, have escaped better than any other. As the month closes the corn is nearly all planted and much of it has come up strong under the excessive heat of the last three days.—*Thornville.*

Currant in blossom May 2. Lilac in bloom, May 6. Indian pinks in blossom, May 7. Killing frost, May 13. Roses in blossom, May 31.—*Battle Creek.*

Light frosts, May 12, 16, 22 Killing frosts, May 15, 20, 21.—*Detroit.*

Killing frosts, and formation of ice, May 12, 15, 16, 17, 21. Yardmen commenced mowing Capitol lawn, May 2. Plum trees in bloom, May 1. Cherry and pear trees in bloom, May 3.—*Lansing.*

Frosts have done much damage to all vegetation, May.—*Parkville.*

JUNE.

Light frost, June 7.—*Port Huron.*

Wheat heading, June 1.

Fireflies first seen, June 17.

A month of great drought—with generally hot days and cool nights. The worst June drought ever known, the precipitation for the month being only 0.88 of an inch. Very disastrous for hay and cereal crops. As the month closes the corn, potatoes and beans still look well. It remains to be seen what the drought will do to them.—*Thornville.*

Strawberries ripe, June 6. Cherries ripe, June 11. Raspberries, currants and most other small fruits ripe June 23.—*Battle Creek.*

JULY.

A month of great drought, with generally hot days and cool nights. Dust and smoke were well nigh intolerable. About the worst drought ever experienced, having commenced so early. Crops are very light. Hay is mere nothing, most upland meadows not being mowed at all; wheat not much better; oats very short and light. Other crops may do better if circumstances favor. Marshes are perfectly dry, and wells and streams almost dry. The drought is unbroken as the month closes.—*Thornville.*

Heavy, dense, smoky appearance of atmosphere, July 2, 3, 4, 5, 6, 7, 9, 10, 13, 14, 17, 18, 20, 22, 23.—*Lansing.*

Smoke, July 10, 12, 13, 14, 25, 26.—*Port Huron.*

2.06 inches of precipitation for July is 1.92 inches below the normal for 16 years. The maximum for that period of time was 10.93 inches, in July, 1889, and the minimum was 0.43 of an inch in July, 1890. Normal 3.98 inches. Frost on low land, July 31.—*Parkville.*

AUGUST.

Frosts in low places—very little hurt done.

August was a continuation of the all summer drought—the worst ever known here—partially broken now by the fall during the last week of the month of some copious rains. These have been of great benefit to the crops yet growing, and have put the top soil in fair condition for seeding, but below it is as dry as ashes.—*Thornville.*

Light frost on low ground, Aug. 2.—*Lansing.*

4.73 inches of precipitation for the month is 2.11 inches above the normal for 16 years. The greatest amount during that period was 10.31 inches, in Aug., 1885, and the least amount was 0.29 of an inch, in Aug., 1894. Normal 2.62 inches.—*Parkville.*

SEPTEMBER.

First frost of season, Sept. 29.—*Rockland.*

Light frost, Sept. 14, 24, 30.—*Sault Ste. Marie.*

Light frost, first of season, Sept. 1. Light frosts, Sept. 24, 28.—*Grand Haven.*

Light frost, first of season, Sept. 24. Light frost, Sept. 28. Killing frost, first of season, Sept. 30.—*Port Huron.*

Trace of snow, Sept. 29.—*Ashton.*

Frost, Sept. 23, 24.—*Ann Arbor.*

The forepart of Sept. was a continuation of the summer drought—the latter part moist enough to make the wheat come up.—*Thornville.*

Frosts, 24, 27, 30.—*Detroit.*

Light frost, Sept. 24.—*Lansing.*

Light frost, Sept. 24 and 25. No damage.—*Parkville.*

OCTOBER.

Depth of snow on ground, Oct. 31, 3.7 inches.—*Marquette.*

Killing frost, Oct. 3.—*Sault Ste. Marie.*

Killing frosts, Oct. 1, 8. First ice, Oct. 20.—*Port Huron.*

The month was one of very great drought—wheat and rye making little growth. Potatoes were badly damaged by the frost of Oct. 22.—*Thornville.*

Light frosts, Oct. 6, 13, 14, 17, 18, 24. Killing frosts, Oct. 1, 20, 30, 31.—*Albion.*

Frost, Oct. 1, 9, 10, 18. Light snow, Oct. 19.—*Ann Arbor.*

Frost, Oct. 1. Light freeze, Oct. 10.—*Battle Creek.*

Killing frost, Oct. 1.—*Detroit.*

Light frosts, Oct. 1, 3. Killing frosts, Oct. 8, 10, 12, 13, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30, 31. Ground froze, Oct. 10, first time of season. Ground froze, Oct. 21.—*Lansing.*

First killing frost, Oct. 1. Wild geese seen Oct. 22.—*Parkville.*

EARTHQUAKE.

Light earthquake, about 5:15 A. M., Oct. 31.—*Battle Creek.*

Earthquake, 5:10 A. M., Oct. 31; no damage.—*Kalamazoo.*

NOVEMBER.

Depth of snow on ground, Nov. 15, trace—Nov. 31, 7.6 inches.—*Marquette.*

Depth of snow on ground, Nov. 31, about 10 inches.—*Harrisville.*

Latter part of month quite wintry. Snow enough fell to make sleighing, but drifted badly.—*Thornville.*

Raining, snowing and freezing, in night, Nov. 24.—*Albion.*

Frosts, Nov. 1, 2, 11, 12, 13, 16, 18. Ice formed over Grand River, first of season, Nov. 21. Sleighing, poor, Nov. 20. Depth of snow on ground Nov. 30, 4 inches.—*Lansing.*

Bees were out, Nov. 7.—*Parkville.*

DECEMBER.

Depth of snow on ground Dec. 31, about 2 ft.—*Rockland.*

Navigation closed, Dec. 8. Depth of snow on ground Dec. 15, 17.8 inches; on Dec. 31, 6.5 inches.—*Marquette.*

Ice in Black River 4 inches thick, Dec. 9. Small ice floating in St. Clair River from Dec. 9 to 17. Navigation on Lake Huron closed, Dec. 28.—*Port Huron.*

Nights that did not freeze, Dec. 19, 20, 21, 24. A stormy month—rain and snow with high winds. The ground was deeply covered with snow before it was much frozen, making very good sleighing which went off with the heavy rains beginning Dec. 18. After the snow melted it was plain to be seen that the wheat and rye had materially improved in appearance while under the snow. They looked well. Snow came again, Dec. 26, and covered them, not so well as before. There is no frost in the ground as the month closes.—*Thornville.*

Depth of snow on ground, 7 inches, Dec. 15; 4 inches, Dec. 31.—*Adrian.*

Frosts, Dec. 4, 12, 15, 21, 22, 23, 26, 27, 28, 29, 30, 31. Grand River opened, Dec. 20. Frost out of ground Dec. 20. Depth of snow on ground, 4 inches, Dec. 15; 4¼ inches, Dec. 31.—*Lansing.*

Bees were out, Dec. 20.—*Parkville.*

MEASUREMENTS AND TEMPERATURE OF GROUND WATER.

In a paper entitled "Typhoid Fever and Low Water in Wells," on pages 89-114 of the Annual Report of this Office for 1884, it is shown that for the years 1878-82 there was a relation between the sickness and deaths from typhoid fever in Michigan and the depth of water in wells. In the month of October, when the water in wells reached the lowest point in the year, there were the most deaths and sickness from typhoid fever; and following the month of April, when the water in wells was highest, there were the least deaths and sickness from typhoid fever. When this comparison is made in a diagram, it is found that, "beginning with June in each year the curve representing sickness from typhoid fever follows more or less closely the curve representing the average depth of earth above the ground water."

On page 256, of the Report of this Board for the year 1889, is a diagram exhibiting the relation of typhoid fever to low water in wells, in Michigan, for the 10 years, 1878 and 1880-88.

On page 229 of the Report for 1891 also on page 226 of the Report for 1892, is a diagram exhibiting the relation of typhoid fever to low water in wells, in Michigan, for the twelve years, 1878 and 1880-90.

On page 271 of the Report for 1893 and on page 300 of the Report for 1894, and on page 322 of the Report for 1895, is a diagram exhibiting the relation of typhoid fever to low water in wells, in Michigan, for the fourteen years, 1878 and 1880-92.

Typhoid fever being one of the most important causes of death in Michigan, it is of very great importance that further evidence be collected on this important subject.

The measurements for each month in 1895, of the depth of a well at each of seven places in Michigan, are shown in Exhbit 8; also the depth of earth above the water, and the temperature of the water in each of the wells. It is hoped that these measurements and observations may continue, and permit a more extended comparison of the depth of water in wells with the sickness from typhoid fever, and with sickness and deaths from other diseases.

CHANGE OF EXPOSURE OF INSTRUMENTS AT LANSING IN 1884.

Comments on the subject of a new instrument shelter at Lansing are printed on page 21, Report for 1885. Exhibits A, B, C, and D, pages 22 and 23, of the Report of 1886, relate to that subject, and may be studied in connection with what is said on page 21, Report for 1885. The fact of the change of place of observation in 1884 may need to be taken into account by whoever studies the meteorology at Lansing through a long series of years.

EXHIBIT 8.—*Depth of Wells; Depth of Ground above Water in Well; Temperature of water in Well, and day of observation of such temperature, in each month of the year 1895, as reported by Meteorological observers for the State Board of Health, and for the United States Weather Bureau.*

Stations in Michigan.	January.			February.			March.			April.			May.			June.		
	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.
Traverse City*	55	41	47^{28}	55	41 4	48^{22}	55	41 3	47^{21}	55	41 4	47^{20}	55	41 2	47^{21}	55	41 4	47^{22}
Lansing, S B. of H.	26 11½	26 3½	51^{17}	26 11½	26 6½	46^{14}	26 11½	26 7½	48^{16}	26 11½	26 6¼	50^{15}	26 11½	26 9½	49^{16}	26 11½	‡26 11½	^{15}
Ann Arbor	17	14 4¼	45^{19}	17	14 8½	41^{16}	17	14 7	42^{16}	17	14 5	43^{15}	17	14 6½	49^{16}	17	14 10	52^{17}
Battle Creek	50 5	48	48^{17}	50 5	45 6	49^{18}	50 7	48 6	49^{19}	54 9	33 6	46^{16}	61 8	55 8	48^{16}	60 9	59 1	53^{16}
Kalamazoo	25	15	48^{15}	25	15	48^{15}	25	15	48^{15}	25	15	47^{15}	25	15	48^{15}	25	15	52^{15}
River Raisin†	23	16	48^{15}	23	16	48^{14}	23	16	48^{15}	23	16	48^{15}	23	17	47^{15}	23	17	48^{15}
Hillsdale	30 6	27	49^{15}	30 6	26 2	48^{16}	30 6	23 9	50^{16}	30 6	24 11	49^{15}	30 6	25 4	49^{15}	30 6	23 8	51^{15}

NOTE.—The small figures above and at the right of the numbers denoting the degrees of temperature, state the day of the month on which the observation was made.

* At Northern Michigan Asylum, W. L. Miller, observer.

† D. W. Palmer, observer.

‡ Well dry,—severe drought.

EXHIBIT 8.—*Depth of Wells, etc.*—CONTINUED.

Stations in Michigan.	July.			August.			September.			October.			November.			December.		
	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft , In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft., In.	Depth of Ground above Water in Well.—Ft , In.	Temp. of Water in Well. —Deg. F.	Depth of Well.—Ft , In.	Depth of Ground above Water in Well.—Ft., In.	Temp. of Water in Well. —Deg. F.
Traverse City*	55	41 4	47^{22}	55	41 4	47^{22}	55	41 4	47^{22}	55	42 2	48^{26}	55	41 4	47^{22}	55	42 2	47^{22}
Lansing, S. B. of H.	26 11½	‡26 11½	^{16}	26 11½	‡26 11½	^{16}	26 11½	‡26 11½	^{15}	26 11½	‡26 11½	^{16}	26 11½	‡26 11½	^{16}	§26 11½	24 6½	51$^{16;\ 20}$
Ann Arbor	17	14 11	54^{14}	17	14 11½	59^{18}	17	14 11½	56^{14}	17	15 4	52^{15}	17	15 2	51^{16}	17	15 2	47^{16}
Battle Creek	60 9	57 9	58^{16}	60 9	57 9	58^{16}	60	57 3	65^{18}	60	59 4	^{15}	60	58 1	^{20}	60	57 3	^{16}
Kalamazoo	25	15	51^{15}	25	15	55^{15}	25	15	51^{16}	25	15	50^{15}	25	15	50^{15}	------	------	------
River Raisin†	23	17 6	48^{15}	23	17 6	54^{15}	23	16 6	45^{15}	23	17 6	45^{14}	23	16 6	48^{14}	23	16	40^{7}
Hillsdale	30 6	27 3	50^{15}	30 6	28	50^{16}	30 6	28 6	50^{15}	30 6	29	50^{15}	30 6	29 3	50^{15}	30 6	29	49^{15}

NOTE.—The small figures above and at the right of the numbers denoting the degrees of temperature, state the day of the month on which the observation was made.

* At Northern Michigan Asylum, W. H. Bauld, observer.

† D. W. Palmer, observer.

‡ Well dry,—severe drought.

§ Well dry, Dec. 16; but after the rains, Dec. 16-20, there were 2 ft., 5 inches of water in the well.

TEMPERATURE OF THE ATMOSPHERE.

Compared with the average for the preceding 31 years at the Agricultural College, the temperature for September was high. A comparison, by months in the preceding 31 years, 1864–94, at the Agricultural College, near Lansing, is given in Exhibit 10.

The average temperature, by months, for the 16 years, 1879–94, at Lansing, and a comparison of 1895, by months, with that average, are stated in Exhibit 11.

The average temperatures at each of 13 stations in Michigan, and the average for 10 stations in 1895, and in each month of that year, are stated in Table I.

EXHIBIT 9.—*Average Temperature by Year and months in 1895,* compared with Annual and Monthly Averages for 1894, and for the 18 years, 1877–94. These Averages are for Groups of Several Stations in Michigan.*

Years, etc.	Average Temperature—Degrees Fahr.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 18 years, 1877-94	46.24	21.37	23.56	29.97	44.40	55.71	66.24	70.80	68.01	61.32	49.49	36.04	28.01
Av. 16 years, 1879-94	45.90	21.13	22.63	29.50	43.76	55.61	66.21	70.46	67.67	60.99	49.25	35.80	27.80
1894 (11 stations)	48.49	27.19	22.37	38.70	46.90	55.24	70.37	73.30	68.74	64.45	50.14	33.09	31.40
1895 (10 stations)	46.37	19.04	17.27	27.39	47.23	59.49	70.60	70.10	70.11	65.92	44.54	36.03	28.68
In 1895 **Higher** than Av. for 18 years, 1877-94	.13	------	------	------	2.83	3.78	4.36	------	2.10	4.60	------	------	.67
In 1895 **Lower** than Av. for 18 years, 1877-94	------	2.33	6.29	2.58	------	------	------	.70	------	------	4.95	.01	------
In 1895 **Higher** than in 1894	------	------	------	------	.33	4.25	.23	------	1.37	1.47	------	2.94	------
In 1895 **Lower** than in 1894	2.12	8.15	5.10	1.31	------	------	------	3.20	------	------	5.60	------	2.72

NOTE.—The stations represented in the lines for average temperature for the years 1877–94 in Exhibit 9, are the following: Port Austin for 1885, 1888, 1889; Mendon for 1877-82; Nirvana for 1877–79 and first four months of 1880; Reed City for the last eight months of 1880 and 1881–85; Kalamazoo for 1877–89; Coldwater, Ypsilanti, Woodmere Cemetery (near Detroit), for 1877–79; Otisville for 1878–80, 1882; Niles for 1878–79, 1881; Washington for 1879-83; Benton Harbor for 1877–78; Petoskey for 1878–79; Parkville for 1881–82; Hillsdale for 1882–84; Winfield for 1881-1883; Mallory Lake for first seven months of 1881, Hudson for last five months of 1881; Ionia for 1883–85; Manistique, Swartz Creek, for 1884–85; Mackinaw City for 1884-87; Muskegon, Pentwater for 1886; Marquette for 1879--84, 1886–87; Escanaba for 1880–87; Alpena, Grand Haven, Port Huron for 1879–87; Detroit for 1877–87; Otsego for 1887-90; Alma for 1890; Marshall for 1882–92; Gulliver Lake for 1887-90, 1892; Albion for 1890–91; Rockland for 1891-92, 1894. Battle Creek for 1877–80, 1882, 1885, 1888–89, 1891–94; Tecumseh for 1877–85, 1888–89, 1892-94; Harrisville for 1881–82, 1885–86, 1890–94; Thornville for 1877–94; Lansing for 1879–94; Agr'l College, 1877, 1881–94; Ann Arbor for 1881–94; Traverse City for 1882–94; Birmingham for 1887–94; Adrian for 1894.

*Beginning with the year 1885, allowance must be made for Lansing in Exhibit 9, because of a change in location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, Report for 1886.

EXHIBIT 10.—*Comparison of the Average Temperature during the Year and during each month of the year 1895, with the Annual and with the Monthly Averages for the Year 1894, and with the Averages for the 31 Years, 1864–94. Observations made by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Mich.*

Years, etc.	Average Temperature—Degrees Fahr.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 31 years, 1864–94	46.51	21.90	23.82	31.03	45.76	57.64	67.70	71.34	68.55	60.42	48.24	35.44	26.48
1894	48.58	26.88	21.15	40.06	48.44	56.94	71.38	73.22	68.80	63.66	49.80	32.48	30.12
1895	46.67	17.50	16.40	27.20	48.57	61.80	71.40	70.50	71.20	66.60	45.00	35.40	28.50
In 1895 **Higher** than Av. for 31 years, 1864–94	.16	------	------	------	2.81	4.16	3.70	------	2.65	6.18	------	------	2.02
In 1895 **Lower** than Av. for 31 years, 1864–94	------	4.40	7.42	3.83	------	------	------	.84	------	------	3.24	.04	------
In 1895 **Higher** than in 1894	------	------	------	------	.13	4.86	.02	------	2.40	2.94	------	2.92	------
In 1895 **Lower** than in 1894	1.91	9.38	4.75	12.86	------	------	------	2.72	------	------	4.80	------	1.62

EXHIBIT 11.—*Average Temperature by Year and Months in 1895* compared with Annual and Monthly Averages for 1894, and for the 16 Years, 1879–94. Observations made at Office State Board of Health, State Capitol, Lansing, Michigan.*

Years, etc.	Average Temperature—Degrees Fahr.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 16 years, 1879–94.	47.27	22.21	24.30	31.51	46.05	57.67	68.03	72.07	68.56	61.68	50.10	36.58	28.46
1894	49.00	28.56	22.70	40.48	47.77	56.20	71.04	73.59	67.84	64.21	50.39	33.41	31.78
1895	46.74	18.91	16.98	27.92	48.66	60.52	71.56	70.35	70.20	65.88	44.44	35.86	29.55
In 1895 **Higher** than Av. for 16 years, 1879–94	------	------	------	------	2.61	2.85	3.53	------	1.64	4.20	------	------	1.09
In 1895 **Lower** than Av. for 16 years, 1879–94	.53	3.30	7.32	3.59	------	------	------	1.72	------	------	5.66	.72	------
In 1895 **Higher** than in 1894	------	------	------	------	.89	4.32	.52	------	2.36	1.67	------	2.45	------
In 1895 **Lower** than in 1894	2.26	9.65	5.72	12.56	------	------	------	3.24	------	------	5.95	------	2.23

* Beginning with the year 1885, slight allowance should be made for Lansing in Exhibit 11, because of a change in the location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, Report for 1886.

TABLE I.—*Average Temperature in Degrees Fahr., for the Year, and for each Month of the Year 1895, at each of 10 stations in Michigan, and also average line for the 10 stations. From observations made daily at 7 A. M., 2 P. M. and 9 P. M.,* local time, by observers† for the State Board of Health.*

Stations in Michigan.†	Divisions of the State. ‡‡	Temperature in Degrees Fahr.													
		Year.		Months, †† 1895.											
		Norm. **	1895.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 10 stations §	....	......	46.37	19.04	17.27	27.39	47.23	59.49	70.60	70.10	70.11	65.92	44 54	36.03	28.68
Rockland	U. P.	¶	......	e 11.33	h 18.82	g 20.72	.....	c 55.64	b 64 45	g 64.00	e 64.24	h 62.24	f 37.43	d 30.26	e 20.75
Traverse City	N. W.	44.07^{13}	45.15	19.13	16.68	22.89	42 43	57.81	i 71.20	68.52	a 68.10	e 65.65	c 43.89	36.04	29.40
Harrisville	N. E.	42 55^{7}	41.55	16.89	14.25	22.71	38.91	51.12	62.84	63.48	63.69	61.64	43.18	33.40	26.49
Ashton	N. C.	‖	......	20.15	15 90	25.26	47.32	57.65	67.99	67.17	67.96	63 69	42.82	34.56	.....
Thornville	B. & E.	47.86^{19}	46.75	19.92	17.38	26.51	47.78	61.63	71.09	70.40	70.84	65.78	44.62	35.99	29.08
Agr'l College	C.	46.52^{32}	46.67	17.50	16.40	27.20	48.57	61.80	71.40	70.50	71.20	66.60	45.00	35.40	28.50
Lansing, S. B. of H.‡	C.	47.24^{17}	46 74	18.91	16.98	27.92	48.66	60.52	71.56	70.35	70.20	65.88	44.44	35.86	29.55
Adrian	S. C.	48.79^{2}	47.62	19.13	17.62	29.70	49.21	59.92	72.01	72.94	72.83	67.47	45.55	36.29	28.52
Albion	S. C.	§§	......	21.50	20.00	29.70	54.50	62.00	.....	.....	.....	.....	45.91	37.93	30.96
Ann Arbor	S. C.	46.86^{15}	46.72	19.46	18.01	28.00	48.48	59.50	70.50	70.57	70.30	65.90	44.40	36.90	28.60
Battle Creek	S. C.	49.49^{5}	48.37	20.29	20.23	32 22	51.30	61.77	72.39	72.18	71.98	67.38	44.82	36.73	29.16
Tecumseh	S. C.	47.22^{4}	46.43	18.62	17.40	28.28	48.09	59.49	70.58	70.11	70.58	65.73	44.10	36.10	28.04
Birmingham	S. E.	47.65^{9}	47.67	20.56	c 17.79	28.42	48.90	61.30	a 72.42	c 71.96	a 71.36	b 66.88	45.44	a 37.58	29.46

* The daily averages are one-third the sum of these three observations.

† The names of observers, their place of observation, and the counties in which these places are situated, are stated in Exhibit 1.

§ This line is an average for only the 10 stations from which statements nearly complete were received for every month of the year. It does not include Ashton, Albion and Rockland.

** Numbers in this column state the average annual temperature for periods of years ending in each case with December 31, 1895. The small figures above and at the right of numbers which state the temperature, denote the number of years included in the average.

†† The computations for Av. Temp., as tabulated for months in 1895, were made at the following stations: Albion and Ann Arbor. All other computations in Table I. were made at the office of the State Board of Health.

‡ Beginning with the year 1885, allowance must be made for Lansing in Table I., because of a change in the location of the instruments. The amount of the variation by months is shown in Exhibit A, on page 22, Report for 1886.

‡‡ The names of divisions, and the counties in each, are stated in Exhibit I., in a paper which follows on weekly reports of sickness.

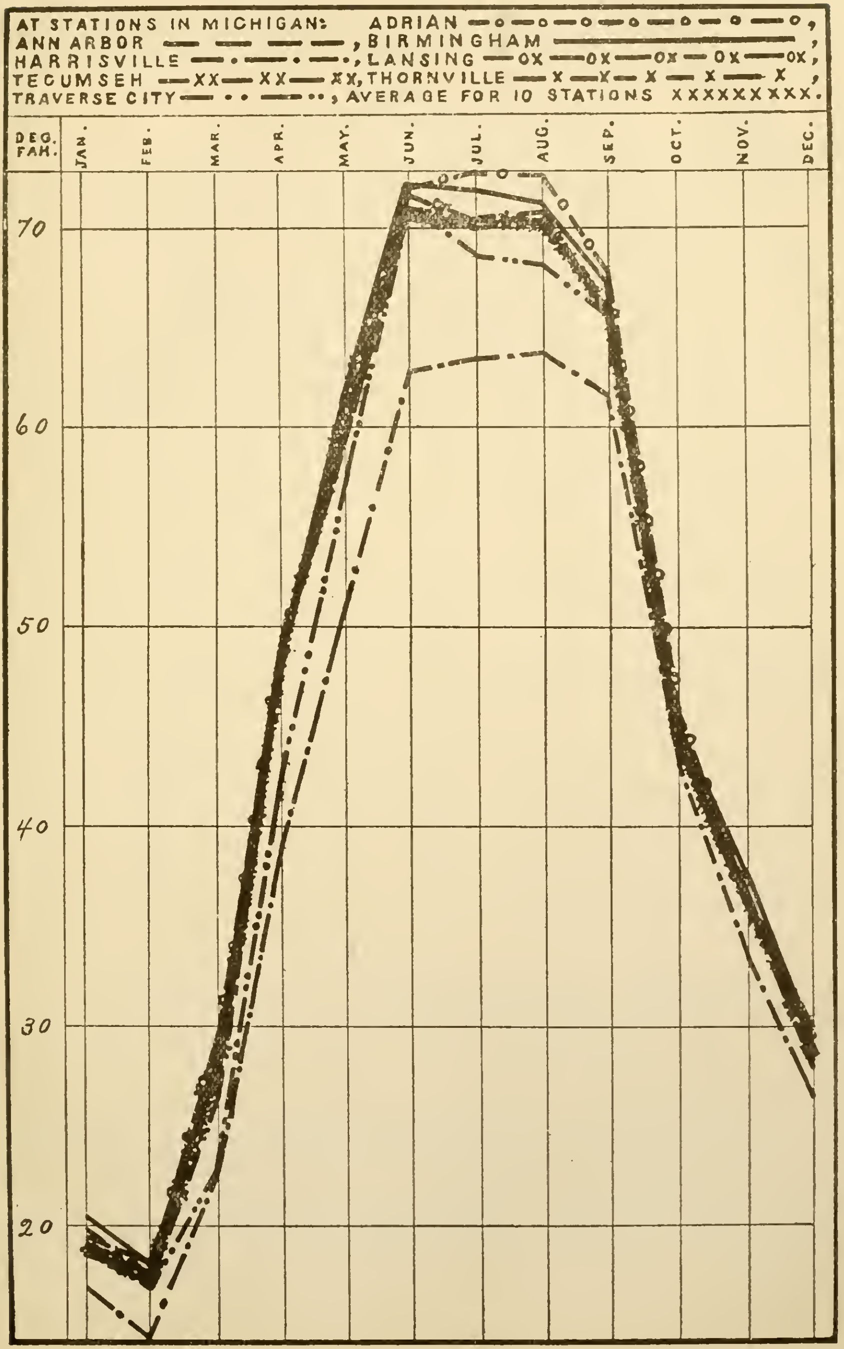
¶ The average for 11 months is 40.17. ‖ The average for 11 months is 46.41. §§ The average for 8 months is 37.81.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 29 days. b For 28 days. c For 27 days. d For 26 days. e For 25 days, f For 24 days. g For 23 days. h For 22 days. i For 20 days. j For 18 days.

The average line and lines for 8 representative stations in Table I. are graphically represented in Diagram I.

DIAGRAM I.– AVERAGE TEMPERATURE BY MONTHS, 1895.



[PLATE 850]

TABLE II.—*Extremes of Temperature and Days of Month on which the Highest and Range for the Year 1895, at each of 16 Stations in Michigan.—As indicated by daily 2 P. M. and 9 P. M., by Observers* for the State Board of Health, and for the U. S.*

Line Number.	Stations in Michigan* (Those of the U. S. Weather Bureau in Italics.)	Year, 1894.			January.		February.		March.		April.		May.	
		Highest.	Lowest.	Range.	Highest.	Lowest.	Highest.	Lowest	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.
1	At 16 Stations†	100	—28	128	50	—12	54	—28	69	—16	82	17	98	26
2	Rockland ‡	----	------	----	41^{10}	-14^{4}	$57^{26,27}$	-25^{1}	$50^{21,22}$	-15^{14}	------	------	91^{29}	24^{13}
3	*Marquette* §	93	—16	109	$33^{10,20,21}$	-10^{28}	54^{28}	$-16^{1,6}$	54^{27}	-12^{14}	73^{28}	22^{11}	98^{29}	$28^{14,20}$
4	*Sault Ste. Marie* §	89	—28	117	38^{22}	-12^{31}	46^{27}	-28^{6}	50^{24}	-16^{4}	70^{20}	$19^{4,11}$	89^{29}	27^{12}
5	Traverse City ‡	98	—18	116	45^{21}	-1^{8}	50^{15}	-18^{5}	54^{27}	-9^{13}	77^{28}	$21^{2,10}$	96^{29}	$27^{14,15}$
6	*Alpena* §	95	—23	118	41^{21}	-2^{28}	53^{28}	-23^{6}	55^{24}	-8^{14}	72^{21}	23^{3}	95^{29}	27^{21}
7	Harrisville ‡	98	—23	121	40^{21}	-9^{27}	50^{28}	-23^{5}	$55^{24,27}$	-9^{13}	72^{24}	17^{1}	95^{30}	26^{20}
8	*Grand Haven* §	90	—8	98	50^{21}	3^{27}	42^{28}	-8^{7}	56^{23}	-2^{14}	80^{30}	26^{2}	87^{30}	29^{20}
9	Ashton	----	------	----	41^{21}	-10^{26}	45^{28}	-30^{5}	56^{28}	-14^{14}	82^{30}	27^{4}	$90^{30,31}$	27^{20}
10	*Port Huron* §	95	—16	111	46^{21}	-8^{28}	49^{28}	-16^{5}	59^{24}	-2^{14}	78^{24}	$25^{3,11}$	93^{30}	$32^{13,15}$
11	Thornville ‡	95	—18	113	46^{21}	-4^{27}	48^{28}	-18^{5}	$58^{24,27}$	-6^{11}	79^{30}	25^{3}	95^{31}	32^{15}
12	Agr'l College ‡	100	—24	124	40^{21}	$-10^{22,23}$	48^{28}	-24^{4}	69^{27}	-12^{4}	82^{30}	$20^{1,2}$	$95^{30,31}$	34^{15}
13	{ Lansing, S. B. of H. ‡ ¶ }	94	—14	108	47^{21}	-6^{27}	48^{28}	$-14^{4,5}$	61^{27}	$-1^{13,14}$	79^{30}	$25^{1,2}$	93^{31}	30^{15}
14	Adrian ††	----	------	----	47^{21}	-7^{30}	56^{28}	-14^{4}	64^{27}	-1^{4}	81^{25}	$25^{2,10}$	93^{31}	$30^{14,20}$
15	Albion ‡	----	------	----	43^{20}	-3^{27}	53^{28}	-9^{6}	57^{24}	2^{3}	80^{30}	25^{2}	91^{31}	33^{13}
16	Ann Arbor ‖	94	—10	104	47^{21}	-7^{28}	51^{28}	-10^{5}	61^{27}	-2^{14}	79^{24}	24^{11}	91^{31}	32^{21}
17	Battle Creek ‡	96	—11	107	47^{7}	$-10^{11,12}$	54^{28}	-11^{6}	60^{29}	3^{14}	$80^{25,30}$	$27^{2,3,4}$	92^{30}	32^{14}
18	Kalamazoo §	94	—11	105	47^{21}	-10^{12}	54^{28}	-11^{7}	65^{28}	3^{14}	81^{30}	27^{3}	$93^{30,31}$	31^{14}
19	Tecumseh ‡	94	—15	109	47^{21}	$-7^{27,30}$	54^{28}	-15^{4}	62^{27}	0^{4}	80^{30}	25^{10}	90^{31}	30^{14}
20	Birmingham ‡	97	—17	114	47^{21}	-9^{30}	51^{28}	-17^{5}	60^{24}	$0^{13,14}$	80^{24}	20^{10}	97^{30}	29^{20}
21	*Detroit* §	96	—8	104	49^{21}	-4^{28}	52^{28}	-8^{5}	62^{27}	2^{14}	80^{25}	25^{3}	95^{31}	33^{12}

NOTE.—The small figures above and at the right of numbers denoting the degrees of temperature, state the day or days of the month on which the highest or the lowest temperature occurred.

* The names of observers, etc., are stated in Exhibit 1.

† The line No. 1, and the three columns for the year 1895, relate only to the 16 stations from which observations were received for every month of the year. It does not include Adrian, Albion, Ashton, and Rockland

‡ For stations marked thus ‡, the daily readings of registering thermometers were recorded at 7 A. M. for the preceding calendar day.

§ At the stations of the U. S. Weather Bureau and at Kalamazoo, the maximum thermometer was read and recorded at 8:00 A. M., and the minimum at 8:00 P. M., 75th meridian time. The local time at these stations corresponding to 8:00 A. M. and 8:00 P. M., 75th meridian time, is as follows: at Port Huron, 7:30 A. M. and 7:30 P. M.; at Detroit, 7:28 A. M. and 7:28 P. M.; at Alpena, 7:26 A. M. and 7:26 P. M.; at Grand Haven, 7:15 A. M. and 7:15 P. M.; at Marquette, 7:11 A. M. and 7:11 P. M.; at Sault Ste. Marie, 7:23 A. M. and 7:23 P. M.; at Kalamazoo, 7:18 A. M. and 7:18 P. M.

‖ At Ann Arbor the registering thermometers were read and recorded at 9 P. M.

¶ Beginning with the year 1885 allowance must be made for Lansing in Table II, because of a change in the location of the instruments. The amount of the variation by months is shown in Exhibit B, on page 22, Report for 1886.

†† The maximum temperature at Adrian was taken from the 2 P. M. readings of the dry bulb of psychrometer.

the Lowest Temperature occurred by Months of the year 1895; also, Extremes and Readings of Registering Thermometers, or by Observations made daily at 7 A. M., Weather Bureau.

June.		July.		August.		September.		October.		November.		December.		Line Number.
Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	Highest.	Lowest.	
99	37	100	38	97	36	98	28	80	10	72	-1	63	-24	1
89^{1}	39^{5}	90^{6}	$42^{1, 8}$	88^{26}	42^{22}	92^{10}	30^{30}	71^{3}	16^{30}	70^{5}	6^{27}	47^{21}	1^{26}	2
93^{1}	40^{5}	86^{5}	43^{1}	87^{16}	45^{21}	93^{10}	37^{29}	73^{5}	20^{20}	66^{5}	8^{27}	46^{17}	3^{30}	3
$87^{8, 9}$	38^{29}	$84^{5, 16}$	40^{10}	87^{26}	$40^{5, 20}$	85^{22}	34^{30}	67^{6}	18^{21}	60^{5}	-1^{21}	47^{25}	-8^{8}	4
98^{10}	41^{5}	94^{16}	49^{1}	88^{26}	45^{1}	93^{11}	35^{29}	$66^{2, 4}$	22^{20}	68^{5}	12^{23}	54^{24}	-1^{12}	5
90^{1}	42^{16}	84^{8}	45^{10}	87^{14}	40^{21}	$91^{20, 21}$	34^{28}	66^{2}	20^{21}	61^{6}	8^{21}	54^{25}	6^{9}	6
94^{1}	37^{6}	89^{8}	42^{9}	87^{26}	39^{20}	98^{11}	$32^{29, 30}$	72^{2}	22^{31}	67^{6}	$5^{20, 21}$	53^{25}	$6^{2, 3, 8, 9}$	7
90^{3}	43^{7}	89^{18}	47^{10}	88^{16}	47^{21}	$85^{11, 21, 22}$	38^{30}	67^{4}	22^{21}	65^{5}	17^{21}	57^{25}	0^{13}	8
92^{10}	$30^{29, 30}$	93^{7}	36^{11}	88^{10}	34^{21}	91^{11}	31^{30}	$69^{4, 6}$	10^{21}	66^{3}	12^{24}			9
95^{3}	40^{7}	92^{7}	44^{10}	92^{10}	47^{20}	94^{11}	34^{30}	69^{2}	19^{21}	69^{6}	9^{21}	59^{25}	5^{5}	10
93^{2}	42^{7}	95^{6}	$46^{10, 11}$	94^{10}	$44^{20, 21}$	94^{11}	35^{30}	80^{2}	22^{21}	71^{6}	5^{21}	59^{25}	3^{13}	11
99^{25}	37^{6}	$100^{6, 7}$	38^{1}	97^{8}	36^{20}	$94^{11, 19, 20, 21, 22}$	28^{30}	$71^{2, 6}$	10^{21}	72^{7}	5^{23}	$56^{24, 25}$	-24^{12}	12
94^{3}	44^{5}	94^{16}	47^{1}	91^{10}	44^{20}	$92^{19, 20, 22}$	34^{30}	$69^{2, 6, 26}$	18^{20}	71^{6}	6^{20}	56^{25}	-10^{12}	13
$94^{3, 25}$	42^{6}	$94^{16, 19}$	$47^{3, 9}$	$94^{10, 17}$	43^{31}	95^{11}	33^{30}	$69^{3, 10}$	17^{29}	$70^{5, 7}$	11^{20}	57^{25}	$-9^{12, 13}$	14
								67^{3}	23^{20}	68^{6}	14^{20}	56^{19}	-3^{12}	15
94^{3}	45^{6}	94^{7}	47^{31}	91^{10}	48^{20}	92^{22}	37^{30}	$67^{2, 6}$	19^{21}	68^{7}	8^{21}	54^{19}	-3^{13}	16
93^{4}	46^{6}	92^{17}	$50^{29, 31}$	96^{12}	$52^{1, 2}$	94^{6}	36^{30}	70^{27}	24^{21}	70^{7}	10^{27}	$58^{20, 21}$	2^{14}	17
$93^{3, 25}$	44^{6}	94^{16}	46^{31}	$94^{9, 10}$	51^{1}	$91^{19, 20}$	38^{30}	70^{26}	24^{21}	$68^{5, 6, 7}$	10^{27}	$56^{19, 20}$	1^{13}	18
$92^{3, 25}$	44^{6}	94^{19}	$48^{3, 9, 30}$	93^{8}	42^{31}	93^{11}	30^{30}	$68^{2, 3, 6, 26}$	18^{29}	71^{6}	9^{20}	56^{25}	-3^{12}	19
96^{2}	40^{6}	97^{6}	43^{9}	96^{10}	43^{19}	92^{11}	35^{29}	70^{2}	19^{20}	$68^{5, 7}$	9^{21}	63^{25}	-4^{13}	20
96^{3}	46^{6}	93^{19}	48^{31}	92^{10}	$51^{1, 21}$	94^{11}	36^{30}	70^{2}	23^{21}	68^{7}	11^{21}	59^{25}	7^{13}	21

The average daily range of temperature at from 6 to 19 stations per year, by months, for a period of 16 years, 1879–1894, and a comparison of 1895, with the monthly averages for that period and for 1894, are given in Exhibit 13. The highest and lowest temperatures in every month in 1895, at each of 16 stations, are stated in Table II. The average daily range of temperature by months in 1895, at each of 19 stations, and the average for 17 of the stations, are stated in Table III. The lines for 8 of these stations, and the average line for 17 of the stations, are represented in Diagram II. It will be noticed that the greatest average daily range occurred during the months of May, June and July.

EXHIBIT 12.—*Average Temperature in Degrees Fah., for the year and months, 1895, at Office State Board of Health, State Capitol, Lansing, Michigan, computed from readings at 7 A. M., 2 P. M. and 9 P. M., daily, from registers of the Draper self-Recording Thermometer, compared with observations made with Green's Standard mercurial Thermometer at the same hours; both thermometers placed in double latticed shelter for instruments, in southwest part of Capitol yard.*

Tri-daily readings of instruments specified.	Year.	Average Temperature, in Degrees Fahr.—Year and Months, 1895.											
		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. Temp. from tri-daily observations with Green's Standard Mercurial Thermometer	46.74	18.91	16.98	27.92	48.66	60.52	71.56	70.35	70.20	65.88	44.44	35.86	29.55
Av. Temp. computed from readings of the Draper's Self-Recording Thermometer	46.42	20.62	18.49	28.75	48.12	59.02	69.82	68.95	68.07	64.40	44.40	36.24	30.17
Higher by Draper's than by Green's Thermometer	------	1.71	1.51	.83	------	------	------	--- --	------	------	------	.38	.62
Lower by Draper's than by Green's Thermometer	.32	------	------	------	.54	1.50	1.74	1.40	2.13	1.48	.04	------	------

EXHIBIT 13.—*Average Daily Range of Temperature, by Year and Months in 1895, compared with Annual and Monthly Averages for 1894, and for the 16 years, 1879-94. These Averages are for Groups of Several Stations in Michigan.*

Years, etc.	Average Daily Range of Temperature—Degrees Fahr.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept	Oct.	Nov.	Dec.
Av. 16 years, 1879-94*	18.00	15.76	17.30	17.37	19.11	20.14	20.47	21.03	20.40	20.06	17.10	14.03	13.19
1894 (16 stations)	17.84	14.45	16.90	16.65	17.86	18.20	22.70	23.15	23.16	20.53	15.76	12.59	12.08
1895 (17 stations)	19.18	15.24	16.07	18.55	19.90	22.41	24.11	23.58	21.93	20.98	18.64	15.19	13.59
In 1895 **Greater** than Av. for 16 years, 1879-94	1.18	------	------	1.18	.79	2.27	3.64	2.55	1.53	.92	1.54	1.16	.40
In 1895 **Less** than Av. for 16 years, 1879-94	--------	.52	1.23	------	------	------	------	-----	------	------	------	------	------
In 1895 **Greater** than in 1894	1.34	.79	------	1.90	2.04	4.21	1.41	.43	------	.45	2.88	2.60	1.51
In 1895 **Less** than in 1894	--------	------	.83	------	------	------	------	------	1.23	------	------	------	------

* Otisville for 1879-80, 1882; Escanaba for 1880-87; Marshall for 1882-92; Reed City for 1882, 1884-85; Washington for 1882-83; Winfield for 1883; Manistique, Ionia, Swartz Creek for 1884-85; Mackinaw City for 1884-87; Hillsdale for 1884; Pentwater, East Saginaw, Hudson for 1886; Port Austin for 1888-89; Gulliver Lake for 1887-90, 1892; Alma, Otsego for 1890; Albion for 1890-91; Manistee for 1889-92; Battle Creek for 1879-80, 1888-89, 1891; Adrian for 1880, 1894; Rockland for 1891-92, 1894; Tecumseh for 1883-85, 1892-94; Marquette for 1879-84, 1886-94; Grand Haven for 1879-88, 1890-94; Detroit for 1879-94; Alpena, Port Huron, Thornville for 1880-94; Kalamazoo for 1880-83, 1886-90, 1892-94; Lansing for 1879-94; Agr'l College for 1881-94; Traverse City for 1882-94; Harrisville for 1882, 1885-94; Ann Arbor for 1882-83, 1885-94; Birmingham for 1887, 1889-94; Sault Ste. Marie for 1892-94.

EXHIBIT 14.—*Comparisons of the Average Daily Range of Temperature for the Year and for each Month of the Year 1895, with Averages for the 21 years, 1874–94 and for the Year 1894. Observations made with Registering Thermometers by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

Years, etc.	Average Daily Range of Temperature—Degrees Fahr.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 21 years, 1874-94*	20.90	12.22	18.76	18.93	22.04	23.20	22.82	25.17	25.88	24.68	20.92	16.23	15.19
1894	23.12	19.45	19.72	17.71	20.70	21.19	29.80	34.97	34.39	26.77	22.07	15.17	15.54
1895	26.93	19.80	20.40	22.30	28.00	27.20	35.50	35.50	33.00	31.80	26.30	23.20	20.16
In 1895 Greater than Av. for 21 years, 1874–94	6.03	7.58	1.64	3.37	5.96	4.00	2.68	10.33	7.12	7.12	5.38	6.97	4.97
In 1895 Less than Av. for 21 years, 1874–94	------	------	------	------	------	------	------	------	------	------	------	------	------
In 1895 Greater than in 1894	3.81	.35	.68	4.59	7.30	6.01	5.70	.53	------	5.03	4.23	8.03	4.62
In 1895 Less than in 1894	------	------	------	------	------	------	------	------	1.39	------	------	------	------

* For the years 1874–6, 1878, 1879 (except Nov. and Dec.), and 1880, the computations were made from the report of observations published in the Reports of the State Board of Agriculture for those years. For 1877, 1881 (except Jan.), 1882–93, the computations were made from registers or copies of registers supplied by Dr. Kedzie.

The average annual and monthly temperature at from 11 to 22 stations for a period of 18 years, 1877–94, is stated in Exhibit 9, in which is also given, by months, a comparison of 1895 with the average for 1894, and with the averages for the 18 years, 1877–1894. By Exhibit 9, which gives averages for groups of several stations in Michigan, it appears that in 1895, the mean temperature in January, February, March, July, October and December was lower than in those months in 1894. It also appears that April, May, June, August, September and December were warmer than the average temperature of the corresponding months for the 18 years, 1877–94.

By Exhibit 16, it appears that, at the Agricultural College, the lowest temperature reached in June, 1895, was below the average lowest temperature for the corresponding month in the preceding 22 years, and that in the month of January, 1895, the range of temperature was less than the average range of temperature for the corresponding month in the 22 preceding years, and also the highest temperature for 1895 was higher than the average highest temperature for the preceding 22 years, and the lowest temperature was below the average lowest temperature for those years. The highest and lowest temperatures at the Agricultural College, in every month in the 7 years, 1889–95, and comparisons of months in 1895 with the average highest and lowest temperatures by months for the preceding 22 years, are stated in Exhibit 16.

TABLE III.—*Average Daily Range of Temperature, by Registering Thermometers during the Year and during each Month of the Year 1895, at each of 17 Stations in Michigan, and Average for 17 Stations.*

Stations in Michigan.* (Those of the U. S. Weather Bureau in Italics.)	Divisions of the State.†	Norm. ‡	Average Daily Range of Temperature—Degrees Fahr.												
			Year 1895.	Months, 1895.											
				Jan.	Feb.	Mar.	Apr.	May.	Jun.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 17 stations §	--------	------	19.18	15.24	16.07	18.55	19.90	22.41	24.11	23.58	21 93	20.98	18.64	15 19	13.59
Rockland	U. P.	------	21.33	[a] 15.54	[e] 19.87	[c] 22.18	[g] 24.94	[b] 27.17	25.70	[d] 24.04	[b] 22.72	[d] 23.96	[c] 18.75	[d] 17.08	[c] 14.00
Marquette	U. P.	15.17^{10}	15.02	11.80	14.00	15.20	13.40	20.20	19.70	17.90	15.70	17.53	13.00	12.00	9.80
Sault Ste. Marie	U. P.	16.82^{4}	17.03	13.30	16.30	19.70	17.00	21.70	23.20	22.20	18.40	17.20	13.40	11.40	11.20
Traverse City	N. W.	19.72^{14}	20.10	16.00	16.25	22.10	19.53	23.48	25.13	22.91	21.45	[c] 21.61	[a] 18.63	16.80	17.33
Alpena	N. E.	15.69^{16}	15.57	13.00	14.43	16.50	13.60	20.20	18 30	20.00	17.30	17.60	15.10	10.80	10.00
Harrisville	N. E.	20.15^{11}	20 36	20.36	22.50	21.87	15.66	21 90	23.53	22.45	21.45	20.70	20.16	17.53	16.23
Grand Haven	W.	14.86^{6}	15.73	12.90	10.70	15 19	18 80	19.80	20.40	19.60	17.00	16.70	14 50	12.40	10.80
Port Huron	B. & E.	15.87^{16}	16.86	12.30	13.90	16.10	17.00	21.40	21.60	20.40	20.50	18.30	16.70	13.00	11.10
Thornville	B. & E.	22.88^{16}	18.27	12.39	12.61	17.61	19.40	21.84	24.33	24.97	23.13	20.60	18.26	14.10	10.00
Agr'l College	C.	20.93^{14}	26.93	19.80	20 40	22.30	28.00	27 20	35.50	35 50	33.00	31.80	26 30	23.20	20.16
Lansing, S. B. of H.	C.	19.49^{17}	20.39	15.58	16.50	18.48	22.27	21.48	25.07	24.55	24.19	23.00	21.94	16.50	15.16
Adrian	S. C.	------	20 75	15 42	16.32	16.78	23.10	23 23	27.16	28.42	24.26	24 10	19 81	15.17	15.20
Albion	S. C.	------	‖	16.20	15 41	17.80	18 20	14 30	-----	-----	-----	-----	20.29	15.67	14.54
Ann Arbor	S. C.	18.06^{14}	20.17	16.50	16.44	19.97	21.10	23.00	24.30	24.30	22 80	21.45	19.70	17 38	15.10
Battle Creek	S. C.	------	¶	15.65	14 75	20.61	-----	18.71	-----	20.13	18.07	19.63	18 00	16.43	13.61
Kalamazoo	S. C.	17.07^{4}	18.44	16.23	14.25	19 94	21.27	22.23	22.73	22.45	21.61	[f] 18.05	18.23	12.40	11.90
Tecumseh	S. C.	19.81^{4}	20.55	16.06	16.36	16.81	22.40	22.00	24.77	24.77	24.58	23.93	24.06	16.70	14.18
Birmingham	S. E.	21.34^{9}	22.36	19.16	19.32	19.49	21.97	24.16	[b] 29.06	26.80	[a] 25.74	22 90	22.23	18.93	18.55
Detroit	S. E.	15.62^{17}	16.18	12.71	13.07	15.16	18.80	19.97	19.43	19.55	19.06	17.17	16.10	12.80	10.32

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 1.

† For counties in each division see Exhibit I , in a paper which follows on weekly reports of sickness.

‡ Numbers in this column state the annual average range of temperature for periods of years ending in each case with December 31, 1895. The small figures above and at the right of numbers which state the range of temperature, denote the number of years included in the average.

§ This line is an average for all stations for which statements nearly complete are given for every month of the year. It does not include the lines for Albion and Battle Creek.

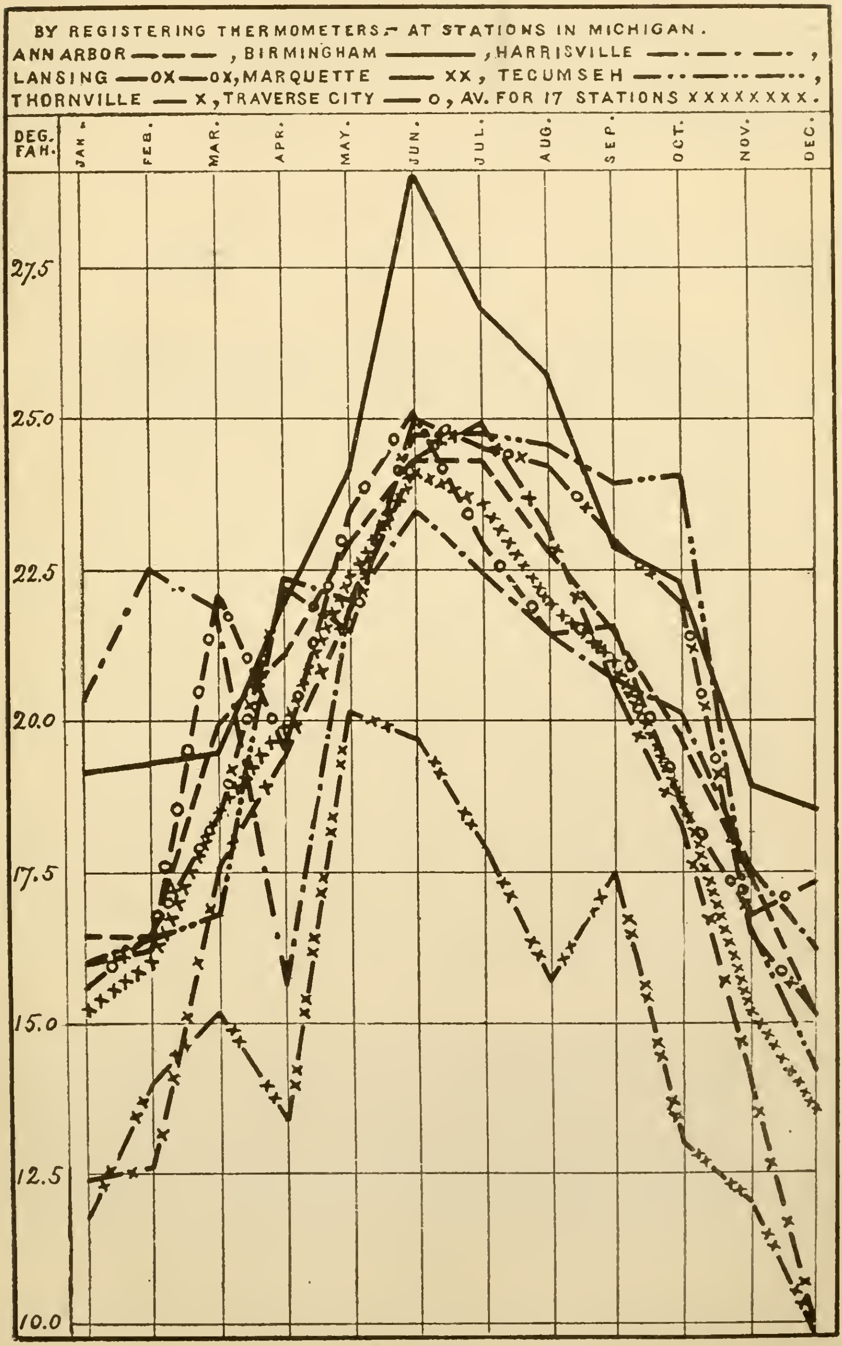
‖ The average for 8 months is 16.55. ¶ For 10 months, 17.56.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 23 days. f For 22 days. g For 18 days.

NOTE.—Graphic representations of statements in Table III., are given in Diagram II.

DIAGRAM II.– AV. DAILY RANGE OF TEMPERATURE, BY MONTHS, 1895.



[PLATE 851]

EXHIBIT 15.—*Comparisons of the Extremes and the Range of Temperature (Degrees Fahr.) during the Year, and during each month of the Year, 1895, with the Average of the Extremes, and of the Range, for the 18 Years, 1877–94, also, Statement of the Extremes and of the Range for each of the Seven Years, 1889–95. Observations made with Registering Thermometers by Observers for the State Board of Health, and for the U. S. Weather Bureau. These Comparisons, etc., are for* **Groups of Several Stations in Michigan.**

Year and Months.	Extremes and ranges of Temperature —Degrees Fahrenheit.																										
	1889.			1890.			1891.			1892.			1893.			1894.			Av. for 18 years, 1877–94.			1895.*			1895 Higher (+), or Lower (-), than Av. 18 years, 1877–94.		
	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.
Year	97	-23	120	100	-26	126	100	-14	114	102	-24	126	97	-26	123	102	-26	128	100	-26	126	100	-28	128	=	—2	+2
Av. month	77	14	63	79	10	68	78	14	64	77	12	65	77	11	66	81	10	71	78	11	67	80	9	71	+2	—2	+4
January	53	-7	60	66	-14	80	52	-10	62	57	-22	79	49	-26	75	57	-18	75	54	-20	74	50	-12	62	—4	+8	—12
February	49	-23	72	63	-8	71	55	-14	69	52	-24	76	44	-23	67	54	-26	80	55	-21	76	54	-28	82	—1	—7	+6
March	65	5	60	59	-26	85	58	-8	66	64	-13	77	66	-6	72	79	-2	81	65	-13	78	69	-16	85	+4	—3	+7
April	80	14	66	80	1	79	87	10	77	79	13	66	80	9	71	88	12	76	83	8	75	82	17	65	—1	+9	—10
May	95	23	72	91	21	70	85	25	60	85	27	58	88	27	61	94	30	64	89	23	66	98	26	72	+9	+3	+6
June	93	36	57	98	32	66	97	31	66	102	34	68	96	36	60	98	33	65	96	33	63	99	37	62	+3	+4	—1
July	97	36	61	98	39	59	95	37	58	97	41	56	96	43	53	102	37	65	98	40	58	100	38	62	+2	—2	+4
August	94	37	57	100	34	66	100	37	63	95	37	58	97	38	59	99	32	67	97	37	60	97	36	61	=	—1	+1
September	93	25	68	90	27	63	93	35	58	92	30	62	89	22	67	99	29	70	93	29	64	98	28	70	+5	—1	+6
October	76	14	62	80	24	56	87	21	66	82	23	59	84	22	62	80	20	60	84	20	64	80	10	70	—4	—10	+6
November	66	11	55	68	0	68	65	-3	68	64	5	59	68	6	62	67	-7	74	69	1	68	72	-1	73	+3	—2	+5
December	65	2	63	50	-6	56	60	8	52	58	-11	69	62	-14	76	60	-19	79	58	-9	67	63	-24	87	+5	—15	+20

* For the 19 years, 1877–95, the highest temperature was 105°, at Battle Creek, September 9, 1884; the lowest was -36°, at Manistique, January 27, 1885.

Foot-notes to Exhibit 17:

* Beginning with the year 1885, allowance must be made for Lansing in Exhibit 17, because of a change in the location of the instruments. The amount of variation by months is shown in Exhibit C, on page 23, Report for 1886.

† Kalamazoo for 1877–83, 1886–89; Mendon for 1877–82; Otisville for 1878–80, 1882; Niles for 1878–79, 1881; Nirvana for 1878–79 and first four months of 1880; Reed City for last eight months of 1880 and 1881–85; Benton Harbor, Coldwater, for 1877–78; Washington for 1880–83; Petoskey for 1879; Winfield for 1881, 1883; Woodmere Cemetery for 1877–79; Hastings, Parkville for 1882; Hillsdale for 1882–84; Manistique for 1884–85; Mackinaw City for 1884–87; Ionia for 1884; Swartz Creek for 1884–85; Pentwater for 1886; Escanaba for 1880–87; Marquette for 1879–84, 1886–87; Gulliver Lake for 1887–90, 1892; Albion for 1890–91; Battle Creek for 1877–79, 1882, 1885, 1892–93; Alma for 1890; Marshall for 1882–92; Alpena, Grand Haven, Port Huron for 1879–87; Detroit for 1877–87; Rockland for 1892; Tecumseh for 1878–85, 1894; Thornville for 1877–94; Lansing for 1879–94; Agricultural College for 1877, 1881–94; Ann Arbor for 1881–94; Traverse City for 1882–94; Birmingham for 1887–94; Harrisville for 1882, 1885–86.

EXHIBIT 16.—*Comparisons of the Extremes and the Range of Temperature (Degrees Fahr.) during the Year, and during each month of the Year 1895, with the Average of the Extremes and of the Range, for the 22 years, 1873-94, also Statements of the Extremes and of the Range for each of the 7 years, 1889-95. Observations made with Registering Thermometers (except for the first two months of 1873, and for those two months with an ordinary thermometer, at 7 A. M., 2 P. M. and 9 P. M.) Daily by Prof. R. C. Kedzie*, at the State Agricultural College, near Lansing, Mich.

Year and Months.	Extremes and Range of Temperature—Degrees F.																										
	1889.			1890.			1891.			1892.			1893.			1894.			Av. 22 years, 1873-94.			1895.*			1895 Higher (+), or Lower (—), than Av. 22 years, 1873-94.		
	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.	Highest.	Lowest.	Range.
Year	93	-15	108	97	-4	101	97	-4	101	95	-20	115	95	-16	112	102	-18	120	95	-17	112	100	-24	124	+5	—7	+12
Av. Month	73	20	53	74	21	53	73	19	54	71	19	52	74	18	56	78	15	63	74	18	56	77	12	65	+3	—6	+9
January	50	2	48	63	3	60	51	2	49	50	-20	70	45	-16	61	52	-18	70	48	-11	59	40	-10	50	—8	+1	—9
February	42	-15	57	61	12	49	54	-4	58	48	-14	62	43	-10	53	47	-17	64	50	-9	59	48	-24	72	—2	—15	+13
March	65	8	57	52	-4	56	58	2	56	62	9	53	63	5	58	75	9	66	61	1	60	69	-12	81	+8	—13	+21
April	75	20	55	76	20	56	79	19	60	73	20	53	76	21	55	77	18	59	77	17	60	82	20	62	+5	+3	+2
May	88	29	59	83	28	55	80	26	54	80	31	49	83	33	50	85	30	55	85	29	56	95	34	61	+10	+5	+5
June	85	39	46	92	39	53	88	37	51	87	42	45	90	51	39	96	34	62	90	40	50	99	37	62	+9	—3	+12
July	89	47	42	92	44	48	86	42	44	95	45	50	92	46	46	102	37	65	93	45	48	100	38	62	+7	—7	+14
August	93	42	51	97	34	63	97	40	57	90	45	45	95	38	57	99	32	77	94	39	55	97	36	61	+3	—3	+6
September	92	25	67	90	29	61	90	38	52	87	39	48	84	22	62	99	29	70	89	32	57	94	28	66	+5	—4	+9
October	73	17	56	76	25	51	84	21	63	78	24	54	84	22	62	80	20	60	79	21	58	71	10	61	—8	—11	+3
November	58	11	47	62	20	42	58	0	58	58	13	45	65	6	59	65	10	55	63	9	54	72	5	67	+9	—4	+13
December	62	14	48	47	7	40	55	12	43	46	-10	56	62	-8	70	53	-10	63	53	-3	56	56	-24	80	+3	—21	+24

*For the 23 years, 1873-95; the highest temperature was 101°, August 11, 1874; the lowest was -33°, February 8, 1875, and the range was 134° F.

Foot-notes to Exhibit 19:

*Beginning with the year 1885, allowance must be made for Lansing in Exhibit 19, because of a change in the location of instruments. The amount of the variation is shown in Exhibit D, on page 23, Report for 1886.

†Mackinaw City for 1884-87; Kalamazoo for 1878-83, 1886-89; Mendon for 1878-82; Otisville for 1878-80, 1882; Nirvana for 1878-79 and first four months of 1880; Reed City for last eight months of 1880 and 1881-85; Niles for 1878-79, 1881; Woodmere Cemetery for 1878-79; Washington for 1880-83; Coldwater for 1878; Petoskey for 1879; Mallory Lake for first seven months of 1881; Hudson for last five months of 1881; Hillsdale for 1882-84; Hastings for 1882; Winfield for 1883; Manistique, Swartz Creek for 1884-85; Ionia for 1884; Pentwater for 1886; Marquette for 1879-84, 1886-87; Escanaba for 1880-87; Alpena, Grand Haven, Port Huron for 1879-87; Detroit for 1878-87; Gulliver Lake for 1887-90, 1892; Alma for 1890; Marshall for 1882-92; Albion for 1890-91; Rockland for 1892; Battle Creek for 1878-79, 1882, 1885, 1892-93; Tecumseh for 1878-85, 1894; Harrisville for 1882, 1885-86, 1894; Thornville for 1878-94; Ann Arbor for 1881-94; Lansing for 1879-94; Agr'l College for 1881-94; Traverse City for 1882-94; Brimingham for 1887-94.

EXHIBIT 17.—*Average Absolute Humidity, by year and months in 1895, compared with Annual and monthly Averages for 1894, and for the 18 years, 1877-94.* These Averages are for groups of several stations in Michigan.*

Years, etc.	Absolute Humidity—Grains of Vapor in a Cubic Foot of Air.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 18 years, 1877-94†	3.45	1.45	1.55	1.84	2.79	3.92	5.53	6.06	5.72	4.90	3.53	2.31	1.81
1894 (7 stations)	3.61	1.77	1.40	2.52	3.12	4.16	6.07	5.90	5.43	5.32	3.59	2.04	1.98
1895 (8 stations)	3.35	1.19	1.17	1.49	2.90	4.42	5.56	5.39	5.87	5.37	2.76	2.23	1.82
In 1895 Greater than Av. for 18 years, 1877-94	------	------	------	------	.11	.50	.03	------	.15	.47	------	------	.01
In 1895 Less than Av. for 18 years, 1877-94	.10	.26	.38	.35	------	------	------	.67	------	------	.77	.08	------
In 1895 Greater than in 1894	------	------	------	------	------	.26	------	------	.44	.05	------	.19	------
In 1895 Less than in 1894	.26	.58	.23	1.03	.22	------	.51	.51	------	------	.83	------	.16

For foot-notes to Exhibit 17 see page 28.

EXHIBIT 18.—*Comparison of the Average Absolute Humidity for the year and for each month of the year 1895, with Averages for the 29 years, 1866-94, and for the year 1894. Observations made at 7 A. M., 2 P. M. and 9 P. M., daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Mich.*

Years, etc.	Absolute Humidity—Grains of Vapor in a Cubic Foot of Air.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 29 years, 1866-94	3.48	1.47	1.56	1.87	2.74	4.02	5.69	6.32	5.91	4.86	3.36	2.22	1.72
1894	3.79	1.74	1.36	2.59	3.33	4.29	6.16	5.98	6.52	5.60	3.76	2.11	2.04
1895	3.76	1.31	1.26	1.68	3.28	4.61	5.88	5.94	6.84	6.27	3.35	2.58	2.08
In 1895 Greater than Av. for 29 years, 1866-94	.28	------	------	------	.54	.59	.19	------	.93	1.41	------	.36	.36
In 1895 Less than Av. for 29 years, 1866-94	------	.16	.30	.19	------	------	------	.38	------	------	.01	------	------
In 1895 Greater than in 1894	------	------	------	------	------	.32	------	------	.32	.67	------	.47	.04
In 1895 Less than in 1894	.03	.43	.10	.91	.05	------	.28	.04	------	------	.41	------	------

EXHIBIT 19.—*Average Relative Humidity, by year and months, in 1895,* compared with Annual and Monthly Averages for 1894, and for the 17 years, 1878–94. These averages are for groups of several stations in Michigan.*

Years, etc.	Per Cent of Saturation—Relative Humidity.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 17 years, 1878–94†	76	83	83	79	71	70	73	71	73	75	76	80	83
1894 (7 stations)	75	82	81	77	73	76	70	63	68	74	78	80	81
1895 (8 stations)	74	80	78	75	70	70	66	66	72	72	72	79	82
In 1895 Greater than Av. for 17 years, 1878–94	------	------	------	------	------	------	------	------	------	------	------	------	------
In 1895 Less than Av. for 17 years, 1878–94	2	3	5	4	1	0	7	5	1	3	4	1	1
In 1895 Greater than in 1894	------	------	------	------	------	------	------	3	4	------	------	------	1
In 1895 Less than in 1894	1	2	3	2	3	6	4	------	------	2	6	1	------

For foot-notes to Exhibit 19 see page 29.

EXHIBIT 20.—*Comparison of the Average Relative Humidity of the Air (Per Cent of Saturation) for the year, and for each month of the year 1895, with Averages for the 31 years, 1864–94, and for 1894. Observations made at 7 A. M., 2 P. M. and 9 P. M., daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

Years, etc.	Per Cent of Saturation—Relative Humidity.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 31 years, 1864–94	79	86	85	82	70	69	76	73	76	79	79	82	86
1894	78	83	77	77	72	75	72	65	83	80	85	86	86
1895	80	88	81	80	74	67	68	72	80	82	86	90	92
In 1895 Greater than Av. for 31 years, 1864–94	1	2	------	------	4	------	------	------	4	3	7	8	6
In 1895 Less than Av. for 31 years, 1864-94	------	------	4	2	------	2	8	1	------	------	------	------	------
In 1895 Greater than in 1894	2	5	4	3	2	------	------	7	------	2	1	4	6
In 1895 Less than in 1894	------	------	------	------	------	8	4	------	3	------	------	------	------

TABLE IV.—ABSOLUTE HUMIDITY.—*The Average Number of Grains of Vapor of Water in a Cubic Foot of Air for Months and Year, 1895, at 12 Stations in Michigan; also Average Line for 8 Stations.—Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State.†	Grains of Vapor in a Cubic Foot of Air—(Absolute Humidity.)§													
		Year.		Months, 1895.											
		Norm. ‡	1895.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct	Nov.	Dec.
Av. for 8 Stations¶	--------	------	3.35	1.19	1.17	1.49	2.90	4.42	5.56	5.39	5.87	5.37	2.76	2.23	1.82
Rockland	U. P.	------	**	----	----	------	----	4.01	[d] 5.28	[d] 5.06	[g] 5.29	[i] 4.86	[h] 2.62	----	------
Traverse City	N. W.	3.37[14]	3.36	1.58	1.52	1.66	2.74	4.20	[d] 5.42	5.36	[c] 5.67	[h] 5.16	[f] 2.69	2.37	1.93
Harrisville	N. E.	------	2.83	0.68	0.67	0.88	2.26	3.57	5.03	5.12	5.36	4.82	2.55	1.75	[a] 1.27
Ashton	N. C.	------	††	----	1.56	2.07	----	5.04	5.23	4.93	5.78	5.08	2.79	2.30	------
Thornville	B. & E.	3.66[19]	3.37	1.46	1.36	1.68	2.95	4.60	5.55	5.17	5.46	5.04	2.67	2.39	2.10
Agr'l College	C.	3.52[16]	3.76	1.31	1.26	1.68	3.28	4.61	5.88	5.94	6.84	6.27	3.35	2.58	2.08
Lansing, S. B. of H.‖	C.	3.37[17]	3.16	1.09	1.09	1.45	2.91	4.34	5.15	4.92	5.52	5.02	2.53	2.12	1.76
Adrian	S. C.	------	‡‡	----	----	------	----	4.46	5.48	5.16	5.65	5.15	2.68	----	------
Albion	S. C.	------	¶¶	1.20	1.27	1.62	3.36	5.05	------	------	------	------	2.59	2.32	1.93
Ann Arbor	S. C.	3.49[15]	3.43	1.24	1.21	1.58	2.93	4.64	5.98	5.54	6.07	5.59	2.62	1.93	1.80
Tecumseh	S. C.	3.43[2]	3.27	1.11	1.20	1.56	2.96	4.48	5.34	5.20	5.75	5.16	2.59	2.20	1.71
Birmingham	S. E.	3.59[9]	3.61	1.08	[h] 1.08	1.42	3.15	[a] 4.93	[f] 6.15	[b] 5.89	[b] 6.32	[e] 5.93	3.04	[d] 2.48	1.88

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* The names of observers, their places of observation, and the counties in which these places are situated are stated in Exhibit 1.

† The full names of the divisions and the counties in each division are stated in Exhibit I.. in a paper which follows, on weekly reports of sickness.

‡ Numbers in this column state the average annual Absolute Humidity for periods of years ending in each case with Dec. 31, 1895. The small figures above and at the right of numbers which state the Absolute Humidity, denote the number of years included in the average.

§ The number of grains of vapor in a cubic foot of air at each observation was determined from readings of the psychrometer by means of Glaisher's table, Table XII., of the Smithsonian Meteorological and Physical Tables (1859).

¶ This line is an average for only the stations at which observations were made tri-daily, and from which statements, nearly complete, were received for every month of the year. It does not include the lines for Albion, Rockland, Adrian, and Ashton.

** The average for 6 months is 4.52. †† For 9 months, 3.86. ‡‡ For 6 months, 4.76 ¶¶ For 8 months, 2.42.

‖ Beginning with the year 1885, allowance must be made for Lansing in Table IV., because of a change in the location of the instruments. The amount of variation by months is shown in Exhibit C, page 23, Report for 1886.

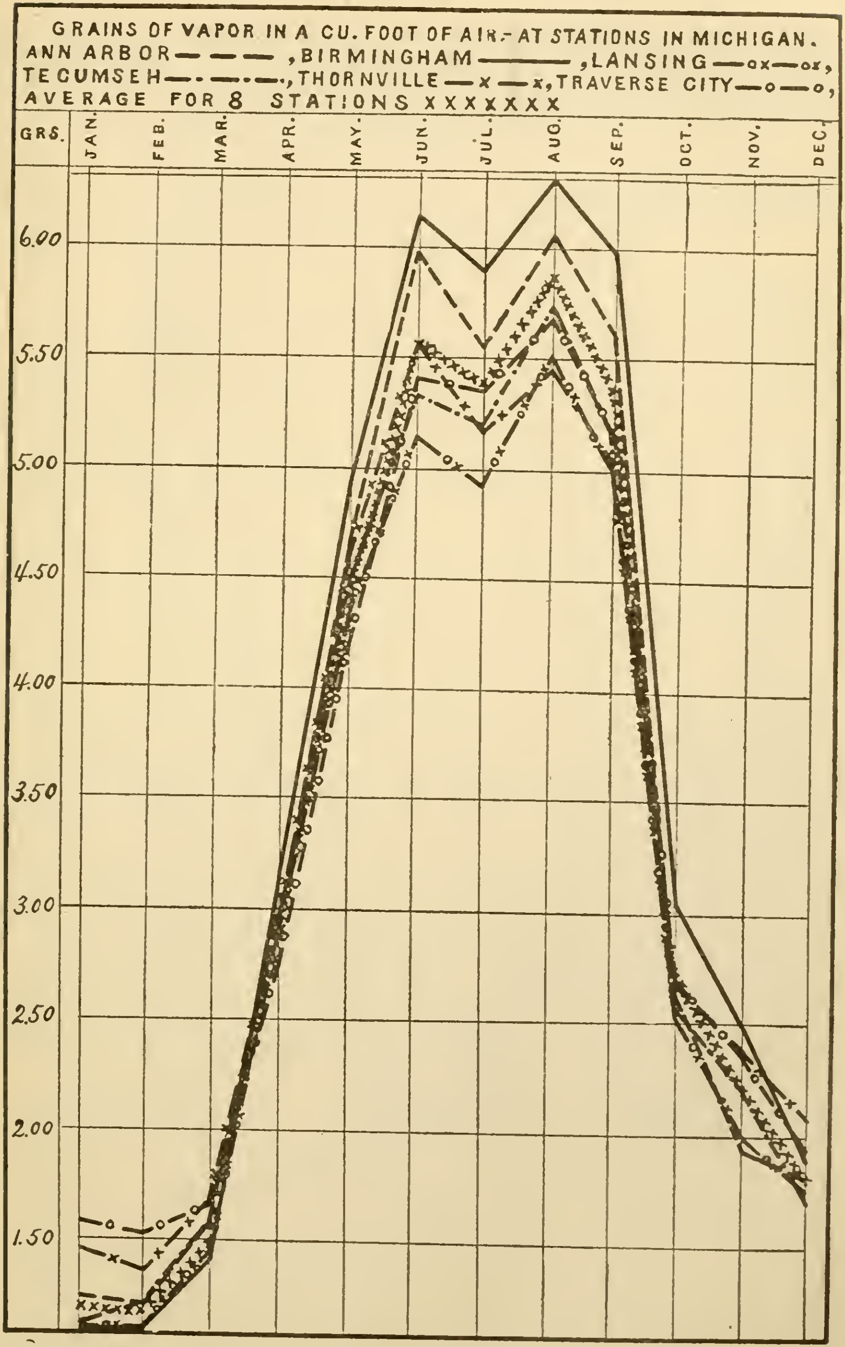
NOTE.—The computations of Absolute Humidity at Ann Arbor and Albion for each month in 1895 were furnished by the observers there. All other computations in Table IV. were made at the office of the Secretary of the State Board of Health.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 92 observations. b For 91 observations. c For 90 observations. d For 89 observations.
e For 88 observations. f For 87 observations. g For 86 observations. h For 83 observations.
i For 81 observations.

The "average" line, and the lines for six stations in Table IV. are graphically represented in Diagram III.

DIAGRAM III - ABSOLUTE HUMIDITY, BY MONTHS, 1895.



[PLATE 852]

TABLE V.—RELATIVE HUMIDITY.—*Average Per Cent of Saturation of the Atmosphere with Vapor of Water for Months and Year 1895 at 12 Stations in Michigan; also average line for 8 Stations. Average of observations made daily at 7 A. M., 2 P. M. and 9 P. M., by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State. †	Per Cent of Saturation.—Relative Humidity.													
		Year.		Months, 1895.											
		Norm. ‡	1895.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 8 Stations §.	----	----	74	80	78	75	70	70	66	66	72	72	72	79	82
Rockland	U. P.	----	¶	----	----	----	----	^{k}70	^{e}77	^{k}72	^{g}76	^{j}76	^{i}83	----	----
Traverse City	N. W.	82^{14}	80	100	99	91	77	70	^{k}65	67	^{c}73	^{i}68	^{f}70	83	91
Harrisville	N. E.	----	64	49	41	50	69	72	74	74	78	71	66	65	60
Ashton	N. C.	----	**	100	99	99	94	86	63	60	72	71	77	85	----
Thornville	B. & E.	78^{18}	75	92	89	84	69	67	62	60	64	66	67	83	92
Agr'l College	C.	79^{32}	80	88	81	80	74	67	68	72	80	82	86	90	92
Lansing, S. B. of H.¶¶	C.	72^{17}	67	75	72	68	63	65	58	56	65	66	65	73	75
Adrian	S. C.	----	‖	----	----	----	----	68	61	56	62	64	65	----	----
Albion	S. C.	----	††	82	82	78	77	77	----	----	----	----	61	75	79
Ann Arbor	S. C.	79^{15}	80	90	97	86	73	77	72	67	75	76	77	82	89
Tecumseh	S. C.	71^{2}	69	73	75	72	67	71	62	61	67	67	65	75	77
Birmingham	S. E.	76^{9}	73	70	71	65	70	^{a}74	^{g}70	^{b}67	^{b}74	^{e}79	76	^{d}82	80

NOTE.—The observations in Table V. were reduced by Guyot's table, in Smithsonian Meteorological Tables, or by a table substantially the same as that. Computations for Ann Arbor and Albion in 1895 were made by the observers there. All other Computations in Table V. were made at the office of the State Board of Health.

*The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 1.

†The full names of the divisions, and the counties in each division are stated in Exhibit I., in a paper which follows, on weekly reports of sickness.

‡ Numbers in this column state the average annual relative humidity for periods of years ending in each case with December 31, 1895. The small figures above and at the right of the numbers which state the relative humidity, denote the number of years included in the average.

§ This line is an average for only the stations at which observations were made tri-daily and from which statements, nearly complete, were received for every month in the year. It does not include Albion, Rockland, Adrian and Ashton.

¶ The average for 6 months is 76. ** For 11 months, 82. ‖ For 6 months, 63. †† For 8 months, 76.

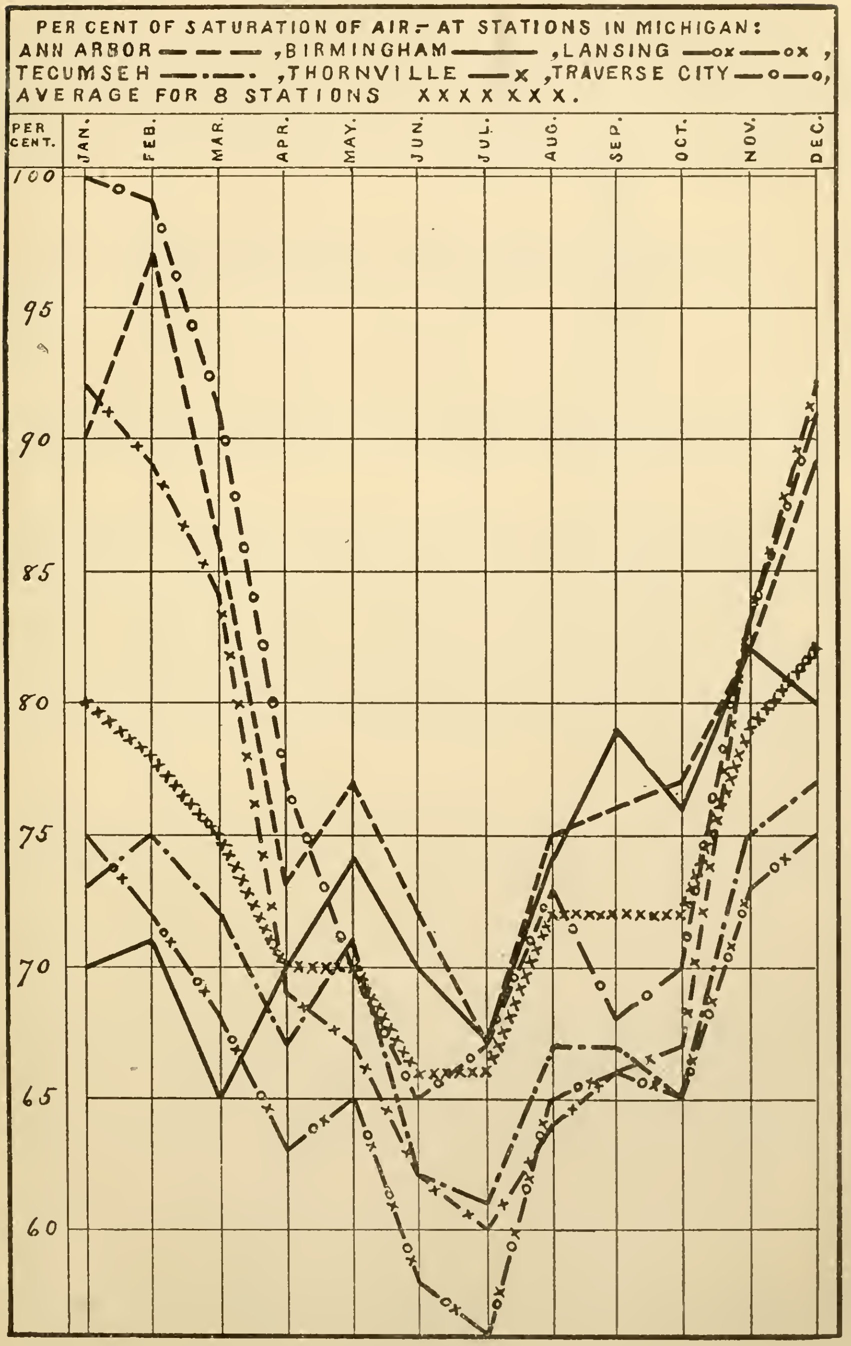
¶¶ Beginning with the year 1885, allowance must be made for Lansing in Table V., because of a change in location of the instruments. The amount of the variation by months is shown in Exhibit D, on page 23, Report for 1886.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to notes below.

a For 92 observations. b For 91 observations. c For 90 observations.
d For 89 observations. e For 88 observations. f For 87 observations.
g For 86 observations. h For 85 observations. i For 83 observations.
j For 81 observations. k For 79 observations.

Graphic representations of 7 representative lines in Table V. are given in Diagram IV.

DIAGRAM IV.—RELATIVE HUMIDITY, BY MONTHS, 1895.



[PLATE 853]

FOGS.

For the year 1895, fog was reported at 68 morning observations, at 9 afternoon observations (at about 2 P. M.), at 21 evening observations (at about 9 P. M.), and 56 times during the day, no special time being mentioned, in many cases the same fog, or fog at the same time, being reported by different observers. Fog was reported, at one or more stations at some time during the day, on 89 days.

EXHIBIT 21.—*Number of different days on which Fog was observed at one or more of 16 Stations in Michigan* in 1895, and each month of the year 1895.*

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
89	4	2	0	6	6	10	11	15	14	8	3	10

* This Exhibit contains statements only for those localities from which reports were received for every month of the year, as follows: Rockland, Marquette, Sault Ste. Marie, Traverse City, Grand Haven, Ashton, Port Huron, Battle Creek, Thornville, Agricultural College, Lansing, Albion, Ann Arbor, Parkville, Birmingham, and Tecumseh.

Exhibit 21, "Number of different days on which fog was observed," etc., supplies knowledge of the *time*, in each month, on which fog was observed, somewhere in Michigan. Exhibit 22, "Number of observations at which fog was observed," etc., supplies knowledge of the *time* combined with the *area* of the occurrences of fog. For the State as a whole, therefore, the last-mentioned exhibit supplies the most important information. Therefore, in this Report the diagram relative to fog is made to exhibit the facts contained in this last-mentioned exhibit. Heretofore it has represented the "Number of different days on which fog was observed at one or more stations in Michigan."

EXHIBIT 22.—*Number of observations at which Fog was observed in Michigan in 1895, and in each month of the year 1895. (Observations taken 3 times daily,* at 16 Stations.†)*

Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
98	9	9	0	4	5	9	6	8	23	6	3	16

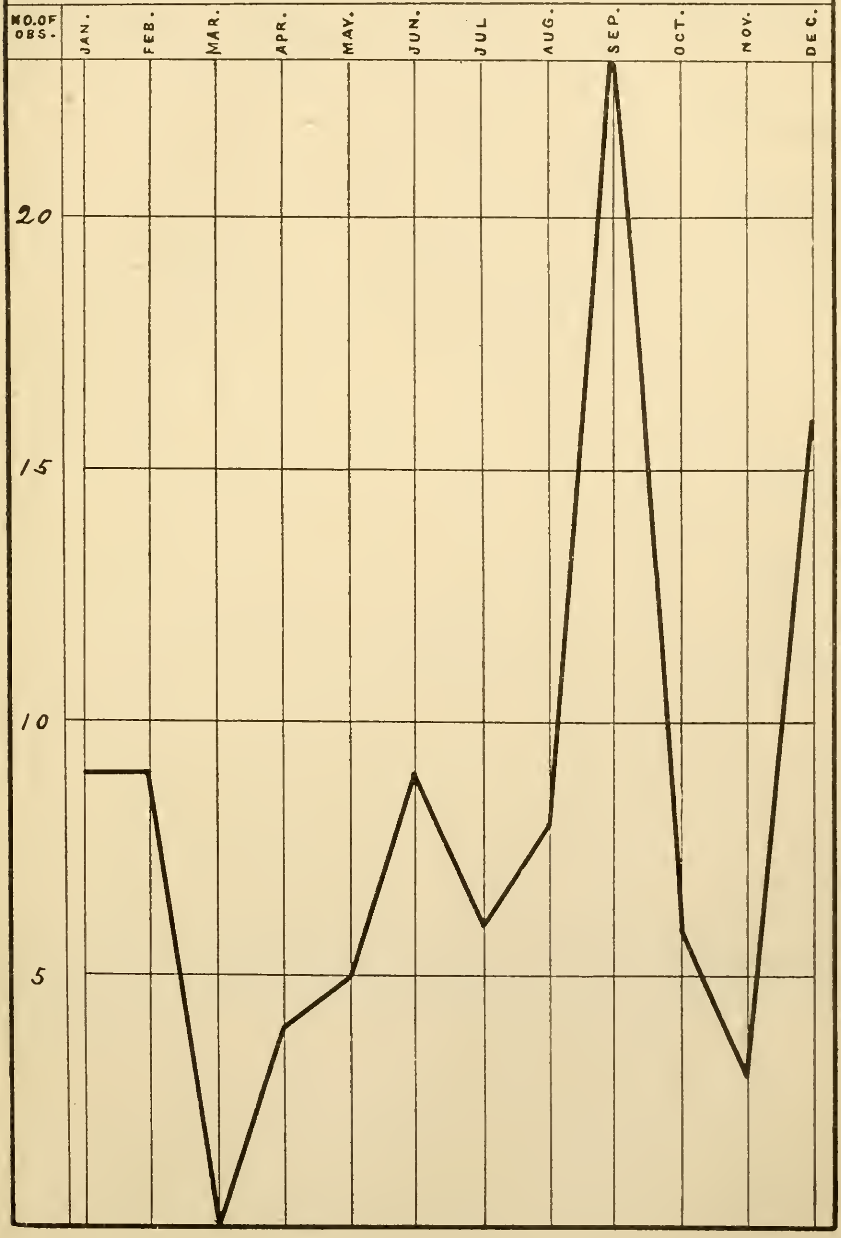
* At the U. S. Weather Bureau Stations the observations were made at 8 A. M. and 8 P. M., 75th Meridian time, unless otherwise stated in Exhibit 23.

† This exhibit contains statements only for those localities from which registers were received for every month of the year; the localities are stated in a foot-note to Exhibit 21 above.

NOTE.—Graphic representations of statements in Exhibit 22 are given in Diagram V.

DIAGRAM V.— CONCERNING FOGS IN MICHIGAN IN 1895.

NUMBER OF OBSERVATIONS OF FOGS, AT ONE OR MORE OF 16 STATIONS IN MICHIGAN, BY MONTHS IN 1895.



[PLATE 854]

EXHIBIT 23.—*Number of different days on which Fog was recorded in 1895, and at 16 stations*

Stations in Michigan.*	No. of days in 1895.	January.			February.			March.			Line number.
		Day of Month.	Hour of Observation.		Day of Month.	Hour of Observation.		Day of Month.	Hour of Observation.		
			A. M.	P. M.		A. M.	P. M.		A. M.	P. M.	
Rockland	7	0			0			0			1
											2
Marquette	14										3
Sault Ste. Marie	6	0			0			0			4
Traverse City	4	0			0			0			5
Grand Haven	18	20		5:00 till	27		5:30 till	0			6
		21	Early morning		28	7:00 till	4:30				7
Ashton	6	20	A. M.	P. M.	27		P. M.	0			8
		21	Morning		28	A. M.	P. M.				9
Port Huron	38	0			0			0			10
											11
											12
											13
											14
Thornville	5	0			0			0			15
Agr'l College	5	0			0			0			16
Lansing, S. B. of H.	28	19		Night till	28	6:30 to 11		0			17
		20	8:00	Night till							18
		21	9:00								19
											20
Albion	3	0			0			0			21
Ann Arbor	6	0			0			0			22
Battle Creek	1	0			0			0			23
Tecumseh	5	0			0			0			24
Birmingham	7	20	7:00		0			0			25
Parkville	13	16			0			0			26

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* The names of observers, their place of observation, and the counties in which the places are situated are stated in Exhibit 1.

in each month, the dates and hours of observations† when Fogs were recorded in Michigan.

Line number.	April.			May.			June.		
	Day of Month.	Hour of Observation.		Day of Month.	Hour of Observation.		Day of Month.	Hour of Observation.	
		A. M.	P. M.		A. M.	P. M.		A. M.	P. M.
1	0	--------	--------	18	7:00	2:00	13	7:00	--------
2	--------	--------	--------	--------	--------	--------	30	7:00	9:00
3	6, 7, 29	--------	--------	3	--------	--------	10, 13, 14, 25, 30	--------	--------
4	0	--------	--------	8	--------	8:00	0	--------	--------
5	8	--------	9:00	7	7:00	--------	0	--------	--------
6	9	--------	During night	7	Early till 10	--------	18	--------	5 to 10
7	--------	--------	--------	--------	--------	--------	--------	--------	--------
8	0	--------	--------	0	--------	--------	0	--------	--------
9	--------	--------	--------	--------	--------	--------	--------	--------	--------
10	9	Early till 9	--------	0	--------	--------	12	--------	Night till
11	13	Early till 10	--------	--------	--------	--------	13	9:30	--------
12	--------	--------	--------	--------	--------	--------	18	--------	Night till
13	--------	--------	--------	--------	--------	--------	19	8:40	5:00 till midnight
14	--------	--------	--------	--------	--------	--------	20	Early till 10	--------
15	0	--------	--------	0	--------	--------	0	--------	--------
16	0	--------	--------	0	--------	--------	0	--------	--------
17	8	--------	Night till	8	--------	Night till	12	--------	Night till
18	9	8:30	--------	9	7:00	--------	13	8:00	--------
19	--------	--------	--------	--------	--------	--------	20	--------	Night till
20	--------	--------	--------	--------	--------	--------	21	5:30	--------
21	0	--------	--------	0	--------	--------	0	--------	--------
22	0	--------	--------	0	--------	--------	0	--------	--------
23	0	--------	--------	0	--------	--------	0	--------	--------
24	0	--------	--------	0	--------	--------	0	--------	--------
25	0	--------	--------	0	--------	--------	0	--------	--------
26	9	--------	--------	8, 9	--------	--------	21	--------	--------

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† At the U. S. Weather Bureau Stations during 1895, the observations were made at 8 A. M. and 8 P. M., 75th Meridian time, unless otherwise stated in this exhibit.

NOTE.—Registers were received, but with no fog recorded thereon, from Harrisville and Adrian for each month in 1895. A cipher (0) indicates that a monthly register was received from the station with no fog recorded thereon.

EXHIBIT 23.—CONCLUDED.—*Dates when*

Stations in Michigan.	July.			August.			September.			Line Number.
	Day of Month.	Hour of Observation.		Day of Month.	Hour of Observation.		Day of Month.	Hour of Observation.		
		A. M.	P. M.		A. M.	P. M.		A. M.	P. M.	
Rockland	1	7:00		5		9:00	11		9:00	1
							18	7:00		2
Marquette	12, 19			4, 6, 23			0			3
Sault Ste. Marie	0			0			1,14,15			4
Traverse City	0			0			9		2:00	5
							17	7:00		6
Grand Haven	0			3			4		10:30 till	7
				27	Early till 10:00		5	7:30		8
							8	Early till 7:00		9
							16		3:30 till	10
							17	1:00		11
							18	9:30 to 11		12
Ashton	0			0			16, 17	A. M.		13
Port Huron	5		Night till	1		Night till	4		7:00 till	14
	6	9:50		2	9:00		5	11:00	7:00 till	15
	14	9:45		17		Night till	6	7:00 till	Night till	16
	20		Night till	18	8:45		7	9:00		17
	21	10:00		24		10:30 till	17	1 to 7		18
	24		Night till	25	Morning					19
	25	9:00	Night till	30	2 to 9					20
	26	8:30								21
Thornville	0			21, 30	Morning		10	Morning		22
Agr'l College	0			0			6, 17	7:00		23
										24
Lansing, S. B. of H.	0			29		Night till	4		Night till	25
				30	7:00		5	7:45	Night till	26
							6	8:30		27
							16		Night till	28
							17	10:00		29
Albion										30
Ann Arbor	24	Morning		0			17	Morning		31
										32
Battle Creek	0			0			0			33
Tecumseh	0			27	7:00		0			34
										35
Birmingham	0			26	7:00		6,10,17	7:00		36
Parkville	0			18, 25, 27, 30	Morning		5, 17	Morning		37

Fogs were recorded in 1895.

Line Number.	October.			November.			December.		
	Day of Month.	Hour of Observation.		Day of Month.	Hour of Observation.		Day of Month.	Hour of Observation.	
		A. M.	P. M.		A. M.	P. M.		A. M.	P. M.
1	0			0			0		
2									
3	0			0			0		
4	5, 6			0			0		
5	0			0			0		
6									
7	0			7		4 to 6	18	9:00	to 3:00
8							21	Early till 10:30	
9									
10									
11									
12									
13	0			0			0		
14	5		10:00 till	0			5	1:00 to 9:30	
15	6	8:20					15		10:00 till
16	25		Night till				16	10:00	
17	26	8:45					22		Night till
18	29		Night till				23	11:30	
19	30	9:00							
20									
21									
22	0			25	A. M.		16	Morning	
23	0			0			13, 15	7:00	
24							23		9:00
25	5		Night till	7	A. M.		12		Night
26	6	7:30					15	8:00 to 10:00	Night
27							18		3:45*
28							22,23,24		Night of 22 to 6:00 of 24
29									
30	25	7:00		7, 8	Morning		0		
31	6, 21			0			15		8:00
32							24		3:00 to 7:00
33	0			8			0		
34	0			7	7:00		15, 18		9:00
35							23	7:00	
36	7	7:00		7	7:00		0		
37	0			0			15, 23		

* Lifted in night.

TABLE VI.—*Average Per Cent of Cloudiness for Months and Year 1895, at 12 Stations in Michigan; also Average Line for 9 Stations. Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M., by observers* for the State Board of Health.*

Stations in Michigan.*	Divisions of the State.†	Average Per Cent of Cloudiness.													
		Year.		Months, 1895.											
		Norm. ‡	1895.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 9 Stations §	--------	------	50	68	57	48	48	44	36	45	38	38	44	65	73
Rockland	U. P.	------	¶	[f] 76	[n] 53	[c] 36	----	[n] 47	[e] 47	[p] 32	[h] 39	[k] 50	[e] 62	[f] 75	[d] 80
Traverse City	N. W.	59^{14}	54	80	67	44	[f] 44	[b] 45	[f] 31	[q] 39	[b] 41	[j] 47	[d] 59	69	81
Harrisville	N. E.	60^{11}	61	68	61	51	55	61	40	75	52	38	62	81	91
Ashton	N. C.	------	**	43	28	19	22	22	12	9	20	20	24	44	----
Thornville	B. & E	51^{19}	42	62	48	47	42	31	27	29	29	35	34	57	64
Agr'l College	C.	57^{32}	51	66	66	54	49	46	40	45	41	32	41	63	70
Lansing, S. B. of H.	C.	57^{17}	54	74	64	50	52	49	44	41	48	40	49	69	73
Albion	S. C.	------	††	69	58	45	46	37	------	------	------	------	40	67	71
Ann Arbor	S. C.	57^{16}	44	65	48	43	38	38	36	30	30	35	40	56	68
Battle Creek	S. C.	48^{5}	49	69	54	45	50	41	37	40	37	39	39	69	73
Tecumseh	S. C.	43^{2}	41	65	48	[a] 38	[f] 42	38	29	[m] 34	[c] 22	29	[b] 30	[c] 54	[a] 62
Birmingham	S. E.	59^{9}	56	[g] 66	[o] 57	[i] 59	[k] 57	[e] 51	[l] 38	[m] 76	[l] 39	[i] 46	[c] 44	[i] 64	[g] 74

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 1.

† The full names of divisions and the counties in each division are stated in Exhibit I., in a paper which follows, on weekly reports of sickness.

‡ Numbers in this column state the average per cent of cloudiness for periods of years ending in each case with Dec. 31, 1895. The small figures above and at the right of numbers which state the per cent of cloudiness, denote the number of years included in the average.

§ This line is an average for only the stations at which tri-daily observations were made, and from which statements, nearly complete, were received for every month of the year. It does not include the lines for Rockland, Ashton and Albion,

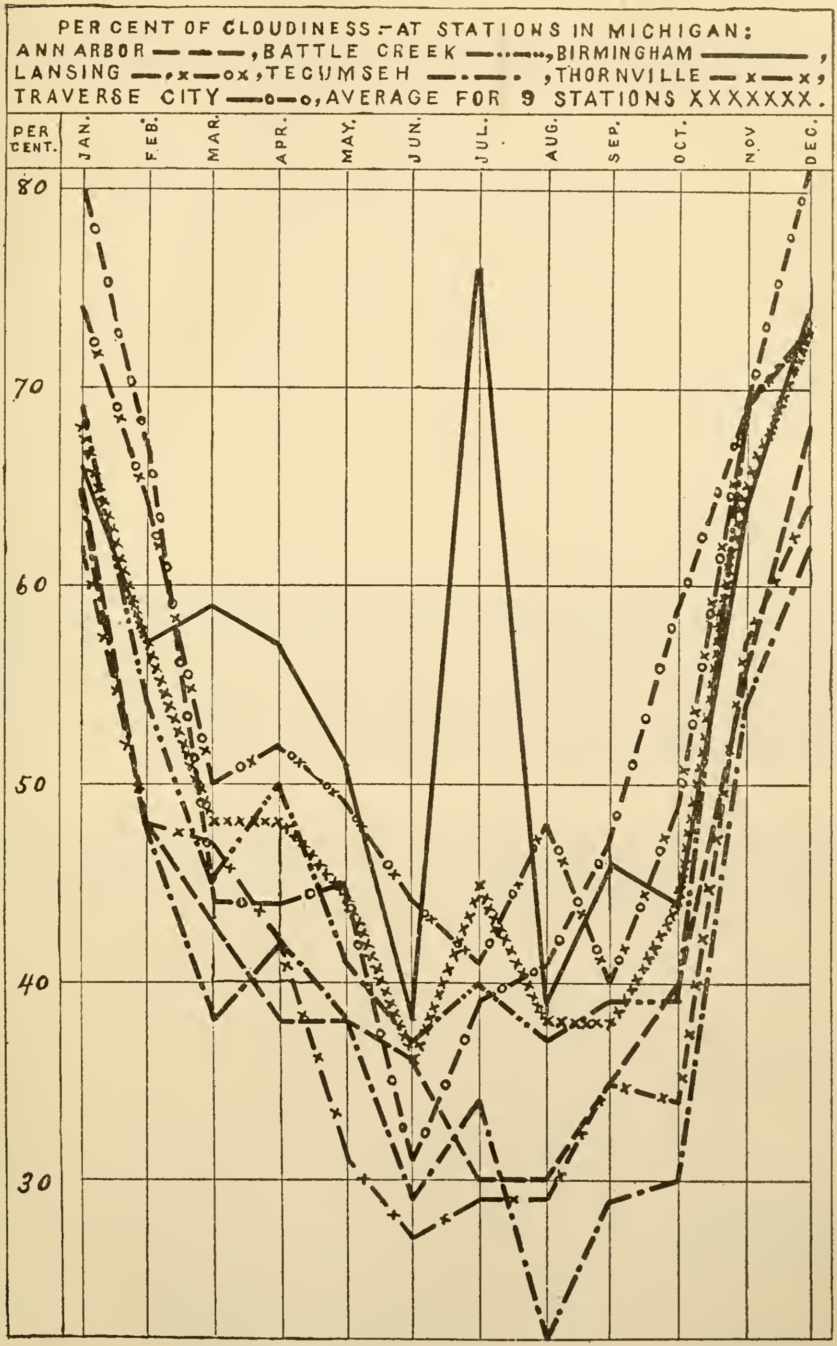
¶ The average for 11 months is 54. ** For 11 months, 24. †† For 8 months, 54.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 92 observations.
b For 91 observations.
c For 89 observations.
d For 88 observations.
e For 87 observations.
f For 86 observations.
g For 84 observations.
h For 83 observations.
i For 82 observations.
j For 81 observations.
k For 79 observations.
l For 78 observations.
m For 76 observations.
n For 75 observations.
o For 74 observations.
p For 69 observations.
q For 64 observations.

Graphic representations of 8 representative lines in Table VI., are given in Diagram VI.

DIAGRAM VI.– AV. PER CENT OF CLOUDINESS, BY MONTHS, 1895.



[PLATE 855]

EXHIBIT 24.—*Average Per Cent of Cloudiness, by Year and Months in 1895, Compared with Annual and Monthly Averages for 1894, and for 18 years, 1877–94. These Averages are for Groups of Several Stations in Michigan.*

Years, etc.	Per Cent of Cloudiness.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 18 years, '77-94*	56	70	65	58	52	51	48	34	42	44	57	69	74
1894 (9 stations)	54	68	57	55	54	60	41	29	43	41	64	73	63
1895 (9 stations)	50	68	57	48	48	44	36	45	38	38	44	65	73
In 1895 Greater than Av. for 18 years, 1877-94	------	------	------	------	------	------	------	11	------	------	------	------	------
In 1895 Less than Av. for 18 years, 1877-94	6	2	8	10	4	7	12	------	4	6	13	4	1
In 1895 Greater than in 1894	------	------	------	------	------	------	------	16	------	------	------	------	10
In 1895 Less than in 1894	4	0	0	7	6	16	5	------	5	3	20	8	------

* Mendon for 1877-83; Nirvana for 1877–79 and first four months of 1880; Reed City for last eight months of 1880 and 1881-85; Niles for 1878-81; Benton Harbor for 1877-78 and 1880; Coldwater, Woodmere Cemetery for 1877-79; Otisville for 1878-80, 1882; Washington for 1879-83; Ypsilanti for 1877, 1879; Petoskey for 1878-79; Fife Lake for 1877; Ionia for 1880, 1883-85; Adrian for 1880; Hillsdale for 1880, 1882-84; Parkville for 1881-82; Winfield for 1881, 1882; Mallory Lake for first seven months of 1881; Hudson for last five months of 1881; Hastings for 1882; Port Austin for 1883; Manistique, Swartz Creek for 1884-85; Mackinaw City for 1884-87; Pentwater, East Saginaw for 1886; Kalamazoo for 1877-89; Marquette for 1879-87; Escanaba for 1880-87; Alpena, Grand Haven, Port Huron for 1879-87; Detroit for 1877, 1879-87; Otsego for 1886-87, 1890; Gulliver Lake for 1887-90, 1892; Marshall for 1881-92; Albion for 1890-91; Alma for 1890; Rockland for 1891-92; Thornville for 1877-94; Battle Creek for 1877-80, 1882-85, 1888-89, 1891-94; Lansing for 1879-94; Agr'l College for 1877, 1881-94; Ann Arbor for 1880-94; Harrisville for 1882, 1885-94; Traverse City for 1882-94; Birmingham for 1887-94.

EXHIBIT 25.—*Comparison of the Average Per Cent of Cloudiness for the Year, and for each Month of the Year 1895, with Averages for the 31 Years, 1864–94, and for the Year 1894. Observations made at 7 A. M., 2 P. M. and 9 P. M., Daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

Years, etc.	Per Cent of Cloudiness.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 31 years, 1864-94	58	72	65	61	56	51	50	44	45	47	58	67	74
1894	56	64	58	63	61	62	42	29	42	45	67	74	68
1895	51	66	66	54	49	46	40	45	41	32	41	63	70
In 1895 Greater than Av. for 31 years, 1864-94	------	------	1	------	------	------	------	1	------	------	------	------	------
In 1895, Less than Av. for 31 years, 1864-94	7	6	------	7	7	5	10	------	4	15	17	4	4
In 1895 Greater than in 1894	------	2	8	------	------	------	------	16	------	------	------	------	2
In 1895 Less than in 1894	5	------	------	9	12	16	2	------	1	13	26	11	------

EXHIBIT 26.—*Dates of Auroras observed and recorded at 6 stations in Michigan during the year 1895.*

Stations.	Dates of Auroras recorded in 1895.											
	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Rockland									16			
Marquette	1, 31	11, 14, 15	14, 16						15, 16	12	10	
Sault Ste. Marie			14, 16				2, 12		16			
Ashton		15							16	12, 13, 16		
Thornville			16	20				3		12	10	
Lansing		14			29					12, 13	9	

EXHIBIT 27.—*Dates of Solar and Lunar Halos*

Line Number.	Stations.	Dates of Halos Recorded,									
		January.		February.		March.		April.		May.	
		Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.
1	Marquette	------	------	------	2, 5	------	6, 7	------	3	------	------
2	Sault Ste. Marie	------	------	------	------	7, 16, 24, 31	4	------	------	------	------
3	Port Huron	------	------	------	------	------	------	------	------	------	------
4	Thornville	------	9	------	------	------	------	------	------	------	4, 5, 6
5	Lansing, S. B. of H.	31	4	7, 8, 22	2, 5, 6, 7	10, 14, 22	------	5, 26	------	------	3
6	Parkville	------	------	------	------	------	------	------	------	------	------
7	Kalamazoo	------	------	------	------	6, 11	------	------	------	------	------
8	Detroit	------	9, 10	------	------	------	------	------	------	------	------
9	Ann Arbor	------	------	------	------	------	------	------	------	------	------

Parhelia, Jan. 15, 23, 27, 31; Feb. 4, 6, 8; Mar. 27; Apr. 11, 24 —*Lansing.* Jan. 27; Apr. 2, 4.—*Parkville.* Paraselene, Dec. 31.—*Ann Arbor.*

EXHIBIT 28.—*Inches of Rain and Melted Snow, by Year and Months in 1895, compared with Annual and Monthly Averages for 1894, and for the 18 Years, 1877-94. These Averages are for Groups of several Stations in Michigan.*

Years, etc.	Inches of Rain and Melted Snow.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 18 years, 1877-94*	35.08	2.21	2.54	2.26	2.60	3.63	3.85	3.01	2.99	3.11	3.21	3.10	2.60
1894 (16 stations)	28.74	1.77	1.66	2.09	2.46	6.52	2.76	1.30	0.72	3.13	2.76	2.02	1.55
1895 (16 stations)	27.06	2.95	0.72	0.97	1.51	3.04	1.34	1.47	3.23	2.53	1.18	3.48	4.65
In 1895 Greater than Av. for 18 years, 1877-94	------	.74	------	------	------	------	------	------	.24	------	------	.38	2.05
In 1895 Less than Av. for 18 years, 1877-94	8.02	------	1.82	1.29	1.09	.59	2.51	1.54	------	.58	2.03	------	------
In 1895 Greater than in 1894	------	1.18	------	------	------	------	------	.17	2.51	------	------	1.46	3.10
In 1895 Less than in 1894	1.68	------	.94	1.12	.95	3.48	1.42	------	------	.60	1.58	------	------

* Benton Harbor for 1877-78; Mendon for 1877-78, 1880-82; Niles for 1878-81; Nirvana for 1877-79, and to and including April 25, 1880; Reed City from April 26 to December 31, inclusive, in 1880, and for 1881-85; Coldwater, Woodmere Cemetery for 1877-79; Otisville for 1878-80, 1882; Escanaba for 1880-87; Washington for 1880-83; Fife Lake, Ypsilanti for 1887; Winfield for 1881-83; Mallory Lake for first seven months of 1881, Hudson for last five months of 1881; Hastings for 1882; Hillsdale for 1882-84; Ionia for 1883-84; Manistique, Swartz Creek for 1884-85; Mackinaw City for 1884-87; Pentwater, East Saginaw for 1886; Gulliver Lake for 1887-90. 1892; Otsego, Alma for 1890; Hudson for 1886, 1888-89; Manistee for 1889-92; Marshall for 1881-84, 1886-93; Kalamazoo for 1877-90, 1892-94; Rockland for 1891; Battle Creek for 1877-78, 1884, 1888; Tecumseh for 1877-78, 1880-85, 1894; Thornville, Detroit for 1877-94; Agricultural College for 1877-78, 1881-94; Marquette for 1879-84, 1886-94; Alpena, Port Huron for 1879-94; Grand Haven for 1879-88, 1890-94; Lansing for 1880-94; Harrisville for 1881-82, 1887-94; Ann Arbor for 1881-82, 1885-86, 1888-94; Traverse City for 1882-94; Parkville for 1882-83, 1885-94; Birmingham for 1887-94; Sault Ste. Marie for 1892-94.

Recorded on the Monthly Registers in 1895.

Months, 1895.														
June.		July.		August.		September.		October.		November.		December.		Line Number.
Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	Solar.	Lunar.	
									28					1
		24												2
								30						3
									25					4
29, 30	1, 29						3, 4	30		21	3, 27	15,16, 22,28	3, 22, 23, 24	5
												3	22	6
						19								7
														8
													28	9

EXHIBIT 29.—*Comparison of the Rainfall during the Year and during each Month of the Year 1895, with that for the Year 1894, and with the Average for the 31 Years, 1864–94. Observations made by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

Years, etc.	Inches of Rain and Melted Snow.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 31 years, 1864-94	31.05	1.78	1.99	2.38	2.44	3.27	3.99	3.04	2.71	2.79	2.50	2.25	1.88
1894	19.30	1.37	0.53	1.25	2.76	4.83	1.30	0.86	0	2.59	1.91	0.97	0.93
1895	22.80	1.04	0.12	0.27	0.67	2.06	1.01	1.47	4.64	0.85	1.41	3.87	5.39
In 1895 Greater than Av. for 31 years, 1864-94									1.93			1.62	3.51
In 1895 Less than Av. for 31 years, 1864-94	8.25	.74	1.87	2.11	1.77	1.21	2.98	1.57		1.94	1.09		
In 1895 Greater than in 1894	3.50							.61	4.64			2.90	4.46
In 1895 Less than in 1894		.33	.41	.98	2.09	2.77	.29			1.74	.50		

TABLE VII.—*Inches of Rain and Melted Snow for Months and Year 1895, at 16 Stations in Michigan; Also Average Line for 16 Stations,—as compiled from daily observations made by observers* for the State Board of Health, and for the U. S. Weather Bureau.*

Stations in Michigan.* (Those of the U. S. Weather Bureau in Italics.)	Divisions of the State.†	Inches of Rain and Melted Snow.													
		Year.		Months, 1895.											
		Norm. ‡	1895.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	July.	Aug.	Sept.	Oct	Nov.	Dec.
Av. for 16 stations §	--------	-----	27.06	2.95	0.72	0.97	1.51	3.04	1.34	1.47	3.23	2.53	1.18	3.48	4.65
Rockland	U. P.	------	‖	2.50	-----	-----	3.40	4.70	4.32	1.50	2.40	3.40	1.90	1.05	2.30
Marquette	U. P.	32.07^{10}	33.04	5.14	1.31	1.30	1.46	4.88	4.21	1.13	1.70	3.52	2.54	2.83	3.02
Sault Ste. Marie	U. P.	34.69^{4}	30.56	3.17	1.76	1.08	2.58	3.17	0.93	1.34	1.34	7.41	3.58	1.51	2.69
Traverse City	N. W.	37.49^{14}	31.54	4.40	2.09	2.03	1.55	5.01	0.76	0.44	3.33	2.99	2.21	3.13	3.60
Alpena	N. E.	35.20^{23}	21.59	2.72	0.51	0.26	2.70	2.32	1.38	0.52	3.10	2.57	0.77	2.15	2.59
Harrisville	N. E.	33.11^{9}	28.61	4.22	0.52	0.42	2.26	2.79	2.07	1.13	4.86	2.88	0.68	2.78	4.00
Grand Haven	W.	36.14^{5}	25.61	3.77	1.07	0.92	1.33	2.55	0.68	1.70	2.49	2.27	0.43	3.47	4.93
Ashton	N. C.	------	¶	2.73	1.23	1.17	1.43	3.72	1.41	0.30	6.89	5.07	1.21	1.59	-----
Port Huron	B. & E.	31.85^{21}	26.05	2.69	0.18	1.09	1.45	2.83	0.90	1.15	3.15	3.68	0.85	3.91	4.17
Thornville	B. & E.	32.71^{19}	29.27	3.23	0.29	1.13	1.41	3.74	0.87	0.96	4.16	3.19	0.82	4.73	4.74
Agr'l College	C.	30.75^{32}	22.80	1.04	0.12	0.27	0.67	2.06	1.01	1.47	4.64	0.85	1.41	3.87	5.39
Lansing, S. B. of H.	C.	33.07^{16}	27.52	2.66	0.62	1.26	1.12	2.05	1.24	1.72	5.38	0.86	0.87	3.91	5.83
Albion	S. C.	------	**	4.13	2.45	1.46	0.92	2.67	-----	-----	-----	-----	1.22	4.27	7.52
Ann Arbor	S. C.	29.79^{8}	22.77	1.98	0.31	0.76	0.90	3.52	0.56	2.27	2.57	0.94	0.34	3.40	5.22
Kalamazoo	S. C.	31.58^{4}	32.17	3.44	1.37	0.67	1.28	3.52	1.64	1.09	4.63	2.81	1.13	3.92	6.67
Parkville	S. C.	41.92^{15}	30.98	2.84	1.03	1.09	1.36	1.78	1.91	2.06	4.73	1.93	1.20	3.58	7.47
Tecumseh	S. C.	26.60^{2}	24.19	1.49	0.14	0.65	1.33	2.55	1.10	1.77	1.45	0.91	0.88	5.96	5.96
Birmingham	S. E.	29.88^{9}	21.24	1.60	0	0.97	1.38	3.23	1.62	1.42	2.17	2.57	0.67	2.27	3.34
Detroit	S. E.	32.54^{24}	25.04	2.76	0.22	1.69	1.31	2.61	0.55	3.30	1.97	1.15	0.56	4.19	4.73

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* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 1.

† The names of divisions, and the counties in each, are stated in Exhibit I., in a paper which follows on weekly reports of sickness.

‡ Numbers in this column state the annual average rainfall for periods of years ending in each case with December 31, 1895. The small figures above and at the right of numbers which state the rainfall denote the number of years included in the average.

§ This line is an average for only the stations from which statements, nearly complete, are given for every month of the year. It does not include Rockland, Ashton and Albion.

‖ The total rainfall for 10 months is 27.47 inches. ¶ For 11 months, 26.75 inches. ** For 8 months, 24.64 inches.

NOTE.—The computations of amount of rainfall were furnished by the observers at Detroit, Alpena, Grand Haven, Port Huron, Ann Arbor, Albion, Kalamazoo, Sault Ste. Marie and Marquette for the year. All other computations in Table VII., were made in the office of the Secretary of the State Board of Health.

The lines for 8 representative stations in Table VII., are graphically represented in Diagram VII.

DIAGRAM VII.— RAINFALL, BY MONTHS IN 1895.

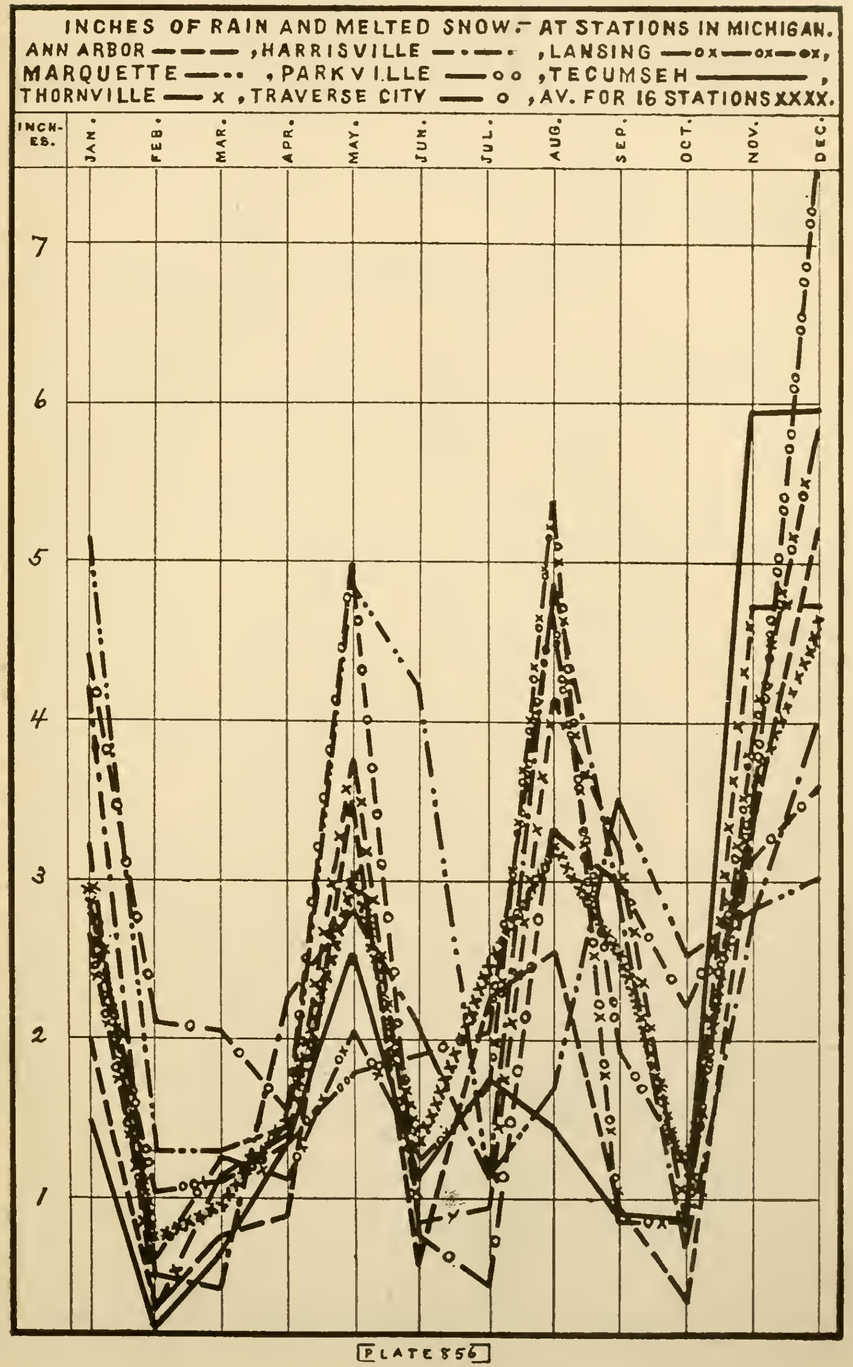


PLATE 856

TABLE VIII.—*Relative amount of Ozone in the Atmosphere by Day, for Months and Year 1895, at 11 Stations, also Average lines for 9 Stations and for 2 Stations in Michigan, as indicated by averages of observations made daily by exposing Test-paper prepared according to Schönbein's formula, from 7 A. M. to 2 P. M.—Recorded according to a scale of 10 Degrees of Coloration of the Test-paper (greatest coloration by Ozone equals 10) by observers for the State Board of Health, and for the U. S. Weather Bureau.**

Stations in Michigan.† (Those of the U. S. Weather Bureau in Italics.)	Divisions of the State. †	Degrees of Coloration of Test-paper.—Day Observation.**													
		Year.		Months, 1895.											
		Norm. ‡	1895.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	July.	Aug.	Sept.	Oct.	[i] Nov.	Dec.
Av. 9 stations §	....	......	3.67	4.18	4.05	4.10	4.07	4.17	3.51	2.91	3.92	3.14	3.04	3.19	3.74
Av. 2 stations ‖	....	......	2.80	1.95	2.32	2.84	2.91	3.65	3.56	3.63	4.15	2.96	1.76	2.08	1.78
Rockland	U. P.	5.61^{2}	5.68	[b] 6.77	[f] 6.05	5.82	[h] 5.66	[d] 5.63	[b] 5.60	[e] 5.19	5.79	[d] 4.73	[a] 5.41	[b] 5.66	[b] 5.79
Traverse City	N. W.	4.23^{14}	6.49	6.70	[d] 6.63	6.41	6.50	6.76	[d] 6.60	6.30	[a] 7.18	[c] 6.18	[b] 6.03	6.25	6.37
Alpena	N. E.	......	¶	3.96	3.54	3.82	3.74	3.93	3.84	3.00	4.27	3.68	3.56	3.18	.....
Harrisville	N. E	3.93^{11}	3.00	3.38	3.08	2.95	2.90	3.60	3.47	2.59	3.85	2.51	2.60	2.41	2.69
Grand Haven	W.	......	4.32	3.01	3.81	4.63	5.17	5.28	5.14	5.08	5.69	4.43	3.09	3.95	2.61
Ashton	N. C.	......	††	6.28	6.68	.....	4.87	5.02	4.07	4.04	5.02	4.24	4.95	6.08	.....
Port Huron	B. & E.	......	1.27	0.89	0.83	1.05	0.64	2.02	1.97	2.17	2.60	1.48	0.43	0.21	0.94
Thornville	B. & E.	3.01^{19}	3.38	6.25	5.68	4.73	3.40	2.86	1.10	1.17	2.27	1.74	2.05	4.31	5.02
Lansing, S. B. of H.	C.	3.14^{17}	2.48	2.76	3.43	2.44	1.90	3.41	2.90	0.59	2.73	2.78	2.72	1.65	2.41
Adrian	S. C.	2.23^{2}	1.88	2.47	2.08	2.37	2.40	1.80	1.30	1.14	1.98	1.28	1.37	1.98	2.34
Albion	S. C.	......	‡‡	3.51	4.08	4.24	4.44	6.02	.....	.....	.....	.....	4.21	4.51	4.44
Ann Arbor	S. C.	3.06^{3}	3.22	2.79	2.90	3.82	3.70	4.41	3.67	3.62	4.24	3.31	1.60	2.05	2.53
Battle Creek	S. C.	2.82^{2}	2.26	1.28	1.33	2.99	5.14	4.05	2.07	1.46	2.43	1.81	1.72	0.85	1.98
Kalamazoo	S. C.	......	¶¶	3.47	3.36	1.89	1.27	1.35	0.90	0.88	1.34	[g] 0.66	1.50	2.88	.....
Tecumseh	S. C.	4.69^{2}	4.63	5.22	5.26	5.37	5.00	5.05	4.90	4.17	4.79	3.88	3.82	3.51	4.53
Birmingham	S. E.	......	§§	2.05	[d] 1.80	2.18	.....	2.51	[b] 2.07	1.77	[a] 2.81	1.91	1.53	1.85	2.27

* At the stations of the U. S. Weather Bureau and Kalamazoo during the year 1895, the observations were made by exposing the test-paper from 8 A. M. to 8 P. M., all 75th Meridian time. The corresponding local time for some of these stations is stated in a foot-note to Table II.

† The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 1. The full names of the divisions and the counties in each division are stated in Exhibit I., in a paper which follows, on weekly reports of sickness.

‡ Numbers in this column state the average annual relative amount of ozone by day for periods of years ending in each case with December 31, 1895. The small figures above and at the right of numbers which state the average, denote the number of years included in the average.

§ This line is an average for only the stations from which statements nearly complete were received for every month in the year. It does not include Birmingham, Ashton, Albion, Kalamazoo and the Weather Bureau Stations.

‖ This is an average line for Grand Haven and Port Huron.

¶ The average for 11 months is 3.68. †† For 10 months, 5.13. ‡‡ For 8 months, 4.43. ¶¶ For 11 months, 1.77. §§ For 11 months, 2.07.

** Allowance has been made for difference in sensitiveness of test-paper. See "i" below.

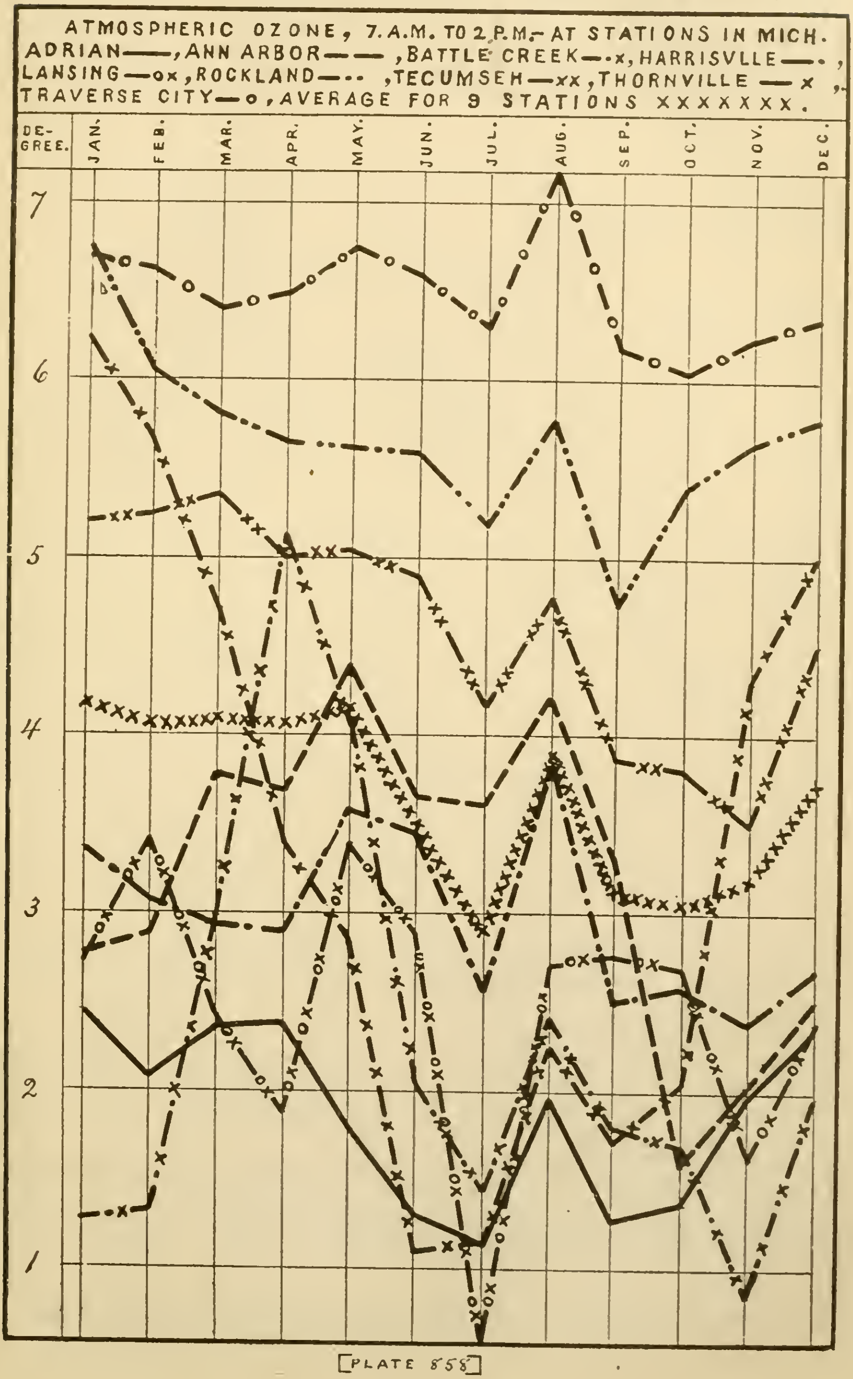
a, b, c. In the columns from January to December, inclusive, the a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 26 days. f For 24 days. g For 22 days. h For 17 days.

i CONCERNING OZONE CORRECTIONS.—It is now believed that the correction (for variation in sensitiveness of different lots of test-paper) applied to the monthly averages in the tables for the day and the night ozone, for the month of November in each of the years 1891, 1892, and 1893, at stations in Michigan and at Lansing, was .39 too great for the day (7 A. M. to 2 P. M.) and .54 for the night ozone (2 P. M. to 9 P. M.). This should be taken into consideration in studying the tables relative to ozone in the Annual Reports of this Board for those years.

Ten lines in this table are represented in Diagram VIII.

DIAGRAM VIII—OZONE, BY DAY, MONTHS IN 1895.



[PLATE 858]

TABLE IX.—*Relative Amount of Ozone in the Atmosphere at Night for Months and Year 1895, at 11 Stations, also Average Lines for 9 Stations and for 2 Stations in Michigan,—as indicated by Averages of Observations made Nightly by exposing Test-paper, prepared according to Schönbein's formula, from 9 P. M. to 7 A. M.,—Recorded according to a scale of 10 Degrees of Coloration of the Test-paper (greatest coloration by Ozone equals 10), by observers for the State Board of Health, and for the U. S. Weather Bureau.**

Stations in Michigan.† (Those of the U. S. Weather Bureau in Italics)	Divisions of the State.‡	Degrees of Coloration of Test-paper.—Night Observation.**													
		Year.		Months, 1895.											
		Norm. §	1895.	Jan.	Feb.	Mar.	Apr	May.	Jun.	July.	Aug	Sept	Oct.	Nov.	Dec.
Av 9 Stations ‖	....	.....	4.09	4.15	4.60	4.65	4.55	4.62	4.16	3.57	4.27	3.49	3.33	3.46	4.24
Av. 2 Stations ¶	....	.....	2.71	2.06	2.47	2.90	2.89	3.67	3.22	3.03	3.87	2.54	2.03	1.78	2.08
Rockland	U. P.	6.14^{2}	6.14	[a] 6.74	[h] 6.45	[b] 6.13	[j] 5.94	[c] 5.81	6.28	[f] 5.93	[b] 6.67	[d] 5.37	[a] 5.77	[d] 6.27	[c] 6.34
Traverse City	N. W.	4.91^{14}	6.62	[a] 6.31	[e] 6.89	6.73	6.57	[a] 6.80	[g] 6.89	6.35	[b] 7.09	[d] 6.60	[b] 6.37	6.43	6.41
Alpena	N. E.	......	††	4.63	4.65	4.54	4.25	4.70	4.44	4.32	5.39	4.04	4.78	4.10	.....
Harrisville	N. E	4.43^{11}	3.16	3.37	3.83	3.31	3.30	3.54	3.08	2.58	3.59	2.48	2.69	2.80	3.31
Grand Haven	W.	......	4.32	3.39	4.03	5.23	5.24	5.38	5.03	4.32	5.18	3.76	3.62	3.56	3.10
Ashton	N. C.	......	‡‡	5.92	6.79	.....	4.97	4.99	4.21	4.38	5.27	4.44	5.01	6.13	.....
Port Huron	B & E	......	1.10	0.73	0.90	0.57	0.54	1.96	1.41	1.74	2.56	1.31	0.43	.....	1.05
Thornville	B. & E	3.72^{19}	4.90	6.47	7.19	6.67	5.67	5.41	3.54	2 80	4.20	3.01	3.33	4.86	5.60
Lansing, S. B. of H.	C.	3.49^{17}	2.70	2.83	3.62	2.41	2.20	3.93	3.34	1.19	3.10	2.91	2.36	1.50	3.05
Adrian	S. C.	2.78^{2}	2.34	2.47	2.83	2.99	3.00	2.09	1.64	1.74	2.36	1.71	1.88	2.46	2.89
Albion	S. C.	......	§§	3.83	4.97	5.54	4.60	5.77	.....	....	.....	.....	3.98	4.00	5.44
Ann Arbor	S. C.	2.86^{3}	2.90	2.73	2.90	3.77	4.10	3.93	3.64	2.61	3.42	2.58	1.30	1.40	2.40
Battle Creek	S. C.	2.60^{2}	2.50	1.31	1.76	3.31	4.14	3.93	2.88	3.26	2.30	1.84	1.95	1.16	2.18
Kalamazoo	S. C.	......	¶¶	3.37	4.08	3.28	2.27	2.32	1.94	1.67	1.94	[i] 1.46	2.27	2.46	....
Tecumseh	S. C.	5.57^{2}	5.56	5.15	5.90	6.54	6.07	6.12	6.14	5.67	5.68	4.91	4.33	4.23	5.99
Birmingham	S. E.	......	‖‖	1.66	[d] 1.99	2.41	.....	2.48	2.51	[a] 1.88	[a] 3.10	2.21	1.36	2.06	2.64

* At the U. S Weather Bureau Stations and Kalamazoo during the year 1895, the observations were made by exposing the test-paper from 8 P. M. to 8 A. M., 75th meridian time. The corresponding local time for some of these stations is stated in a foot-note to Table II.

† The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 1.

‡ The full names of the divisions and the counties in each division are stated in Exhibit I., in a paper which follows, on weekly reports of sickness.

§ Numbers in this column state the average annual relative amount of ozone by night for periods of years ending in each case with December 31, 1895. The small figures above and at the right of the numbers which state the average, denote the number of years included in the average.

‖ This line is an average for only the stations from which statements, nearly complete, were received for every month in the year. It does not include Ashton, Albion, Kalamazoo, Birmingham, and the U. S. Weather Bureau Stations.

¶ This is an average line for Grand Haven and Port Huron.

** Allowance has been made for difference in sensitiveness in test-paper. See "i" foot-note, Table VIII.

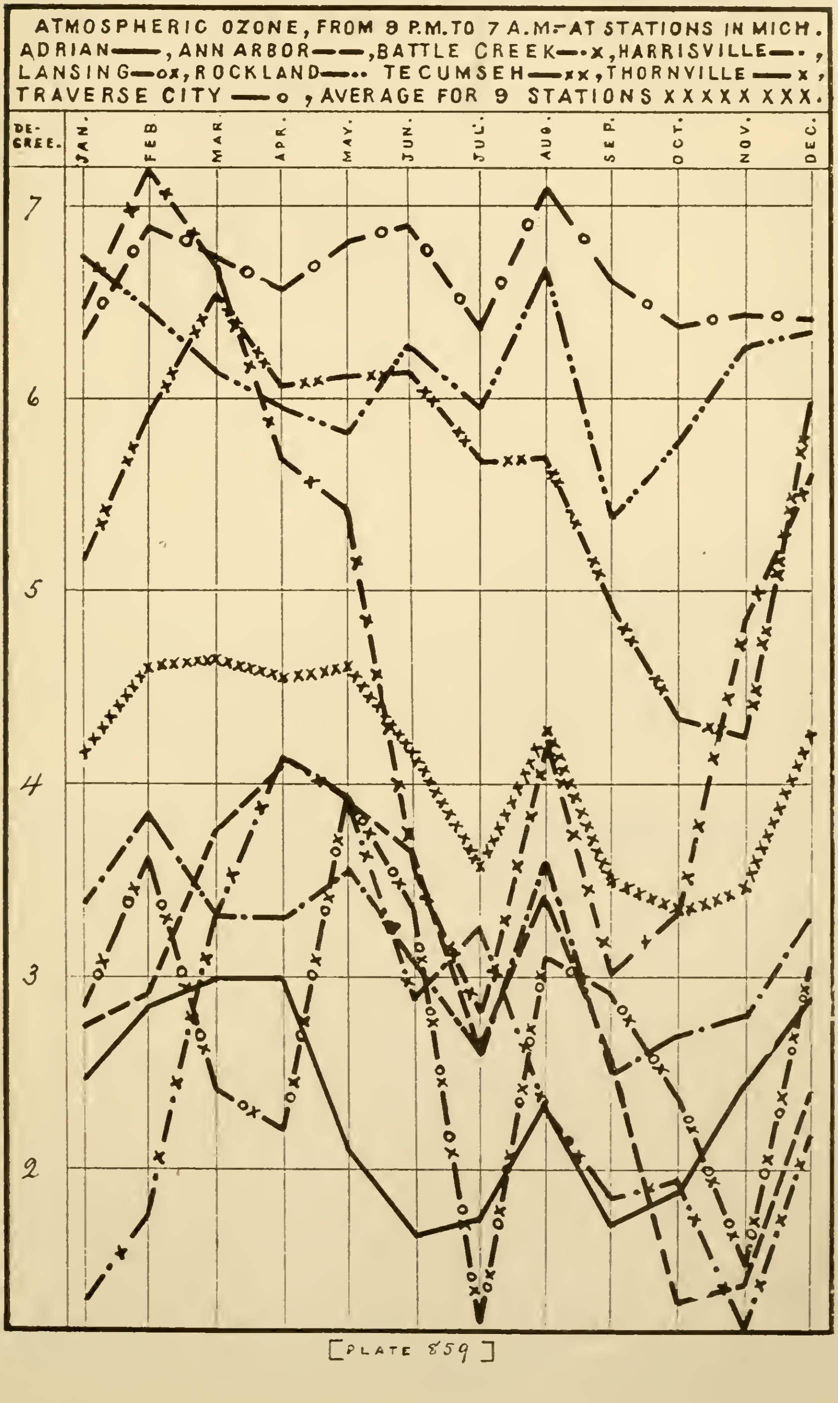
†† The average for 11 months is 4.53. ‡‡ For 10 months, 5.21. §§ For 8 months, 4.77. ¶¶ For 11 months, 2.46. ‖‖ For 11 months, 221.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to the notes below.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 26 days. f For 25 days. g For 24 days. h For 23 days. i For 22 days. j For 15 days.

Ten lines in this table are graphically represented in Diagram IX.

DIAGRAM IX.—OZONE, AVERAGE BY NIGHT, MONTHS IN 1895.



[PLATE 859]

EXHIBIT 30.—*Average Amount of Atmospheric Ozone (Day), by Year and Months, in 1895, compared with Annual and Monthly Averages for 1894, and for the 18 Years, 1877–94. These Averages are for Groups of Several Stations in Michigan.*

Years, etc.	Ozone by Day.—Degrees of Coloration of Test-paper.*												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 18 years, 1877-94†	3.45	3.64	3.76	3.78	3.58	3.68	3.47	3.04	3.37	3.16	3.18	3.21	3.46
1894 (9 stations).....	3.95	4.33	4.68	4.60	4.23	4.60	3.82	3.33	4.21	3.37	3.46	3.41	3.51
1895 (9 stations).....	3.67	4.18	4.05	4.10	4.07	4.17	3.51	2.91	3.92	3.14	3.04	3.19	3.74
In 1895 Greater than Av. for 18 years, 1877-94.....	.22	.54	.29	.32	.49	.49	.04	------	.55	------	------	------	.28
In 1895 Less than Av. for 18 years, 1877-94............	--------	------	------	------	------	------	------	.13	-----	.02	.14	.02	------
In 1895 Greater than in 1894.....	--------	------	------	------	------	------	------	------	------	------	------	------	.23
In 1895 Less than in 1894............	.28	.15	.63	.50	.16	.43	.31	.42	.29	.23	.42	.22	------

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*In this exhibit allowance has been made for difference in sensitiveness of different lots of test-paper.

†Mendon for 1877–83; Niles for 1878–81; Nirvana for 1877–79 and to and including April 25, 1880; Reed City for April 26 to end of year 1880 and for 1881–85; Coldwater, Agr'l College for 1877–78, 1880; Otisville for 1878–80; Washington for 1879–83; Petoskey; Woodmere Cemetery for 1878–79; Fife Lake, Ypsilanti for 1877; Ionia for 1880, 1883–84; Adrian for 1880; Mallory Lake for first seven months of 1881, Hudson for last five months of 1881; Hastings for 1882; Hillsdale for 1882–84; Parkville for 1882; Port Austin for 1883–85, 1888–89; Winfield for 1883; Manistique, Mackinaw City, Swartz Creek for 1884–85; Pentwater for 1886; Kalamazoo for 1877–88; Alpena for 1879–87; Marquette for 1880–81, 1883–84, 1886–87; Grand Haven for 1880–84; Escanaba for 1881–85, 1887; Port Huron for 1881–85; Otsego for 1890; Marshall for 1881–92; Albion for 1890–91; Tecumseh for 1877–85, 1894; Adrian for 1880, 1894; Thornville for 1877–94; Lansing for 1879–94; Ann Arbor for 1880–91, 1893–94; Harrisville for 1881–82, 1885–94; Traverse City for 1882–94; Birmingham for 1886–89; Battle Creek for 1877–80, 1882–84, 1892–94; Rockland for 1891–92, 1894.

EXHIBIT 31.—*Average Amount of Atmospheric Ozone (Night), by Year and Months, in 1895, compared with Annual and Monthly Averages for 1894, and for the 18 Years, 1877–94. These Averages are for Groups of Several Stations in Michigan.**

Years, etc.	Ozone by Night.—Degrees of Coloration of Test-paper.†												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 18 years, 1877-94.	3.60	3.95	4.26	4.23	3.95	3.88	3.61	3.00	3.13	2.95	3.29	3.45	3.83
1894 (9 stations).....	4.31	4.21	4.86	4.62	4.62	5.03	4.64	4.07	4.16	3.67	3.70	3.87	4.23
1895 (9 stations).....	4.09	4.15	4.60	4.65	4.55	4.62	4.16	3.57	4.27	3.49	3.33	3.46	4.24
In 1895 Greater than Av. for 18 years, 1877-94.....	.49	.20	.34	.42	.60	.74	.55	.57	1.14	.54	.04	.01	.41
In 1895 Less than Av. for 18 years, 1877-94............	--------	------	------	------	------	------	------	-----	------	------	------	------	------
In 1895 Greater than in 1894......	--------	------	------	.03	------	------	------	------	.11	------	------	------	.01
In 1895 Less than in 1894............	.22	.06	.26	------	.07	.41	.48	.50	------	.18	.37	.41	------

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*The stations represented in Exhibit 31, are the same as those represented in Exhibit 30, relative to day ozone, and named in foot-note of that exhibit.

†In this exhibit allowance has been made for difference in sensitiveness of different lots of test-paper.

OBSERVATIONS FOR OZONE AT LANSING.

Since July 1, 1884, the observations for ozone at Lansing have been taken at the new shelter for meteorological instruments in the southwest part of the Capitol yard. Previous to July 1, 1884, the observations had been taken at the office window. Exhibit E, page 60, of the report for 1885, shows that the average for the month of July, 1884, is greater at each observation—7 A. M. to 2 P. M., 2 P. M. to 9 P. M., and 9 P. M. to 7 A. M., at the shelter for instruments than at the office window. Possibly this fact should be taken into consideration in studying ozone at Lansing through a long period of years.

EXHIBIT 32.—*Average Velocity of the Wind in Miles per hour, by Year and Months, in 1895, compared with Annual and Monthly Averages for 1894, and for the 13 years, 1882–94. From Registers of the Robinson's Self-Registering Anemometer.* These Averages are for Groups of several Stations in Michigan.*

Years, etc.	Average Miles per Hour.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 13 years, 1882-94.	9.6	10.8	10.8	10.6	10.5	9.5	7.8	7.8	7.6	8.7	9.6	10.8	11.1
1894 (8 stations)----	10.1	10.8	11.7	12.4	9.8	10.5	7.8	8.2	7.3	9.1	9.7	12.0	11.4
1895 (6 stations)----	10.2	11.8	11.7	12.2	9.3	9.5	8.3	8.4	8.1	10.7	11.9	10.2	10.5
In 1895 Greater than Av. for 13 years, 1882-94-----	.6	1.0	.9	1.6	------	0	.5	.6	.5	2.0	2.3	------	------
In 1895 Less than Av. for 13 years, 1882–94-----------	--------	------	------	------	1.2	0	------	------	------	------	------	.6	.6
In 1895 Greater than in 1894------	.1	1.0	0	------	------	------	.5	.2	.8	1.6	2 2	------	------
In 1895 Less than in 1894--------------	--------	------	------	.2	.5	1.0	------	------	-----	------	------	1.8	.9

* Gibbon's Anemometer was used at Ann Arbor.

EXHIBIT 33.—*Average Velocity of the Wind in Miles per hour, by Months for the Years 1880–94, and comparisons of 1895 with this Average and with the year 1894. From Registers of the Robinson's Self-Registering Anemometer in the Office of the State Board of Health, State Capitol, Lansing, Michigan.*

Years, etc.	Miles, by Self-Registering Anemometer.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 15 years, 1880-94	9.8	11.0	11.4	11.2	11.1	9.6	8.2	7.9	7.2	8.5	9.0	10.9	11.3
1894----------------	10.4	11.5	12.3	13.8	9.8	10.2	8.2	8.6	7.1	9.1	10.1	12.0	11.5
1895----------------	9.9	12.2	12.6	12.2	9.4	9.9	8.3	8.4	7.1	9.6	10.8	8.9	9.5
In 1895 Greater than Av. for 15 years, 1880-94-----	.1	1.2	1.2	1.0	------	.3	.1	.5	------	1.1	1.8	------	------
In 1895 Less than Av. for 15 years, 1880-94-----------	--------	------	------	------	1.7	------	------	------	.1	------	------	2.0	1.8
In 1895 Greater than in 1894------	--------	.7	.3	------	------	------	.1	------	------	.5	.7	------	------
In 1895 Less than in 1894--------------	.5	------	------	1.6	.4	.3	------	.2	0	------	------	3.1	2.0

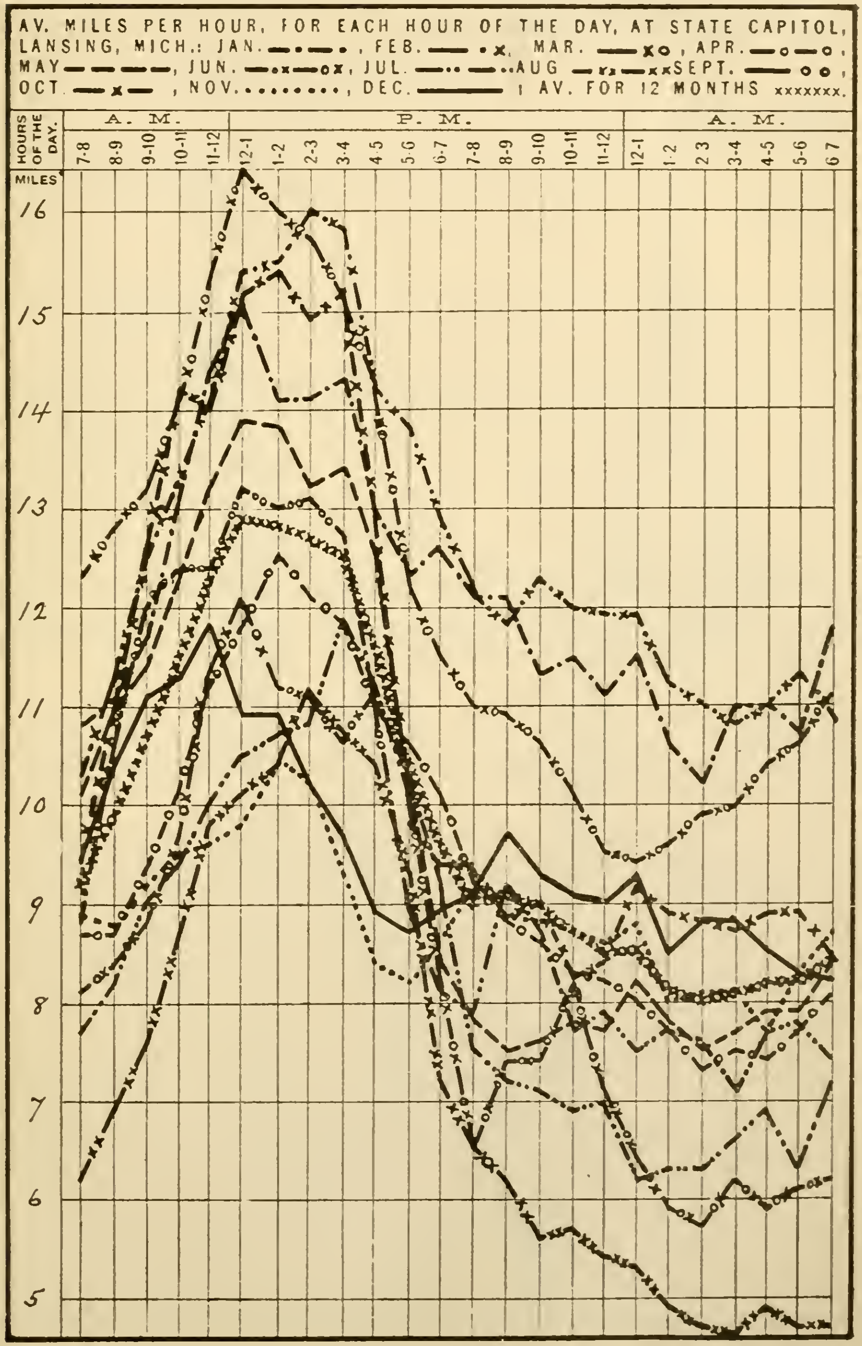
TABLE X.—*Average Velocity of the Wind in Miles per Hour, for each Hour of the Day, by Months of the Year 1895, Compiled from Registers of the Robinson's Self-Registering Anemometer, exposed above the roof of the Capitol, and registering in the office of the State Board of Health, Lansing, Michigan.*

Months.	Averages.			Hours (1895) and Average Miles per Hour.																							
	Av. 16 years, 1880-95.	1894.	1895.	A. M.					P. M.													A. M.					
				7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7	7-8	8-9	9-10	10-11	11-12	12-1	1-2	2-3	3-4	4-5	5-6	6-7
Year	9.8	10.4	9.9	9.2	9.9	10.7	11.5	12.3	12.9	12.8	12.7	12.5	11.6	10.4	9.6	9.0	9.1	8.9	8.7	8.5	8.5	8.1	8.0	8.1	8.2	8.2	8.4
January	11.1	11.5	*12.2	10.8	11.1	11.7	13.1	14.4	15.1	14.1	14.1	14.3	13.0	12.3	12.6	12.1	12.1	11.3	11.5	11.1	11.5	10.6	10.2	11.0	11.0	10.7	11.8
February	11.5	12.3	12.6	10.2	11.3	12.5	12.8	14.1	15.4	15.5	16.0	15.8	14.2	13.8	12.9	12.1	11.8	12.3	12.0	11.9	11.9	11.2	11.0	10.8	11.0	11.3	10.8
March	11.3	13.8	12.2	12.3	12.8	13.2	14.1	15.4	16.4	16.0	15.7	15.1	14.2	12.2	11.5	11.0	10.9	10.6	10.1	9.5	9.4	9.6	9.9	10.0	10.4	10.6	11.1
April	11.0	9.8	†9.4	8.7	8.7	9.4	10.1	11.2	11.8	12.5	12.1	11.8	11.0	10.6	10.1	9.2	8.8	8.6	8.3	8.2	8.0	7.7	7.3	7.5	7.4	7.7	8.1
May	9.6	10.2	*9.9	10.1	11.0	11.4	12.3	13.2	13.9	13.8	13.2	13.4	12.5	10.2	8.4	7.8	7.5	7.6	7.8	7.7	8.2	7.8	7.5	7.7	7.9	7.9	8.4
June	8.2	8.2	†8.3	8.1	8.4	8.8	9.7	11.3	12.1	11.2	11.1	10.6	11.1	10.3	8.3	6.5	7.4	7.4	8.2	7.1	6.4	5.9	5.7	6.2	5.9	6.1	6.2
July	7.9	8.6	8.4	7.7	8.2	9.0	9.4	10.0	10.5	10.7	10.8	11.9	11.2	10.1	9.2	7.5	7.2	7.1	6.9	7.0	6.2	6.3	6.3	6.6	6.9	6.3	7.2
August	7.2	7.1	*7.1	6.2	6.9	7.6	8.7	9.8	10.1	10.4	11.2	10.7	10.4	9.3	7.2	6.5	6.2	5.6	5.7	5.4	5.3	4.9	4.7	4.6	4.9	4.7	4.7
September	8.6	9.1	9.6	8.8	10.6	12.0	12.4	12.4	13.2	13.0	13.1	12.7	11.1	9.0	8.1	7.9	9.2	8.7	7.7	7.9	7.5	7.7	7.6	7.1	7.7	7.8	7.4
October	9.1	10.1	10.8	9.4	11.0	12.6	14.2	14.0	15.2	15.4	14.9	15.2	12.9	9.8	9.4	9.4	8.8	9.0	8.2	8.4	9.2	8.9	8.8	8.7	8.9	8.9	8.4
November	10.8	12.0	†8.9	8.9	8.8	9.2	9.5	9.6	9.8	10.4	10.2	9.3	8.4	8.2	8.6	9.2	9.5	8.8	8.7	8.6	8.8	8.0	8.1	8.1	7.7	8.3	8.7
December	11.2	11.5	†9.5	9.4	10.4	11.1	11.3	11.8	10.9	10.9	10.2	9.7	8.9	8.7	8.9	9.1	9.7	9.3	9.1	9.0	9.3	8.5	8.8	8.8	8.5	8.3	8.2

* For only about 30 days. † For only about 29 days.

The statements in the third figure column in Table X. of the average velocity of the wind in miles per hour, by months, during the year 1895, are graphically represented in Diagram XI. The remaining columns of Table X. for 1895, are graphically represented in Diagram X.

DIAGRAM X.—VELOCITY OF WIND, BY HOURS AND MONTHS, 1885.



[PLATE 860]

TABLE XI.—*Average Velocity of the Wind in Miles per Hour for the Year and for each month of the Year 1895, at 6 Stations in Michigan. Computed from Registers of the Robinson's Self-Registering Anemometer,* by Observers for the State Board of Health, and for the U. S. Weather Bureau.*

Stations in Michigan.†	Divisions of the State.	Miles, by Self-Registering Anemometer.													
		Year.		Months, 1895.											
		Norm. ‡	1895.	Jan.	Feb.	Mar	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 6 Stations	--------	------	10.2	11.8	11.7	12.2	9.3	9.5	8.3	8.4	8.1	10.7	11.9	10.2	10.5
Marquette	U. P.	9.5^{10}	10.4	12.0	11.3	12.4	8.3	8.0	8.6	8.6	9.6	12.7	13.0	10.7	9.8
Sault Ste. Marie	U. P.	8.5^{4}	8.3	8.1	8.6	10.4	7.6	8.0	7.2	7.7	7.4	8.9	9.6	7.9	8.4
Alpena	N. E.	------	------	11.3	10.9	12.2	8.9	8.9	7.9	8.1	7.5	9.8	10.4	9.2	------
Grand Haven	W.	10.7^{6}	10.6	12.7	12.2	12.3	9.6	10.2	7.9	8.1	7.4	11.6	12.5	10.7	11.5
Port Huron	B. & E.	10.6^{14}	11.3	13.2	13.0	13.2	10.9	11.0	8.9	9.1	8.6	11.0	12.8	12.0	12.3
Lansing, S. B. of H.	C.	9.8^{16}	9.8	12.1	12.5	12.2	9.3	9.9	8.3	8.4	7.1	9.7	10.8	8.9	8.9
Ann Arbor	S. C.	------	------	8.7	----	10.3	8.0	6.4	4.1	4.9	4.8	7.0	9.0	7.9	8.8
Detroit	S. E.	10.0^{14}	10.8	12.8	12.8	12.5	10.3	10.1	8.7	8.3	8.2	10.5	12.8	10.9	11.8

* Gibbon's Anemometer was used at Ann Arbor.

† The names of observers, their places of observation, and the counties in which these places are situated are stated in Exhibit 1.

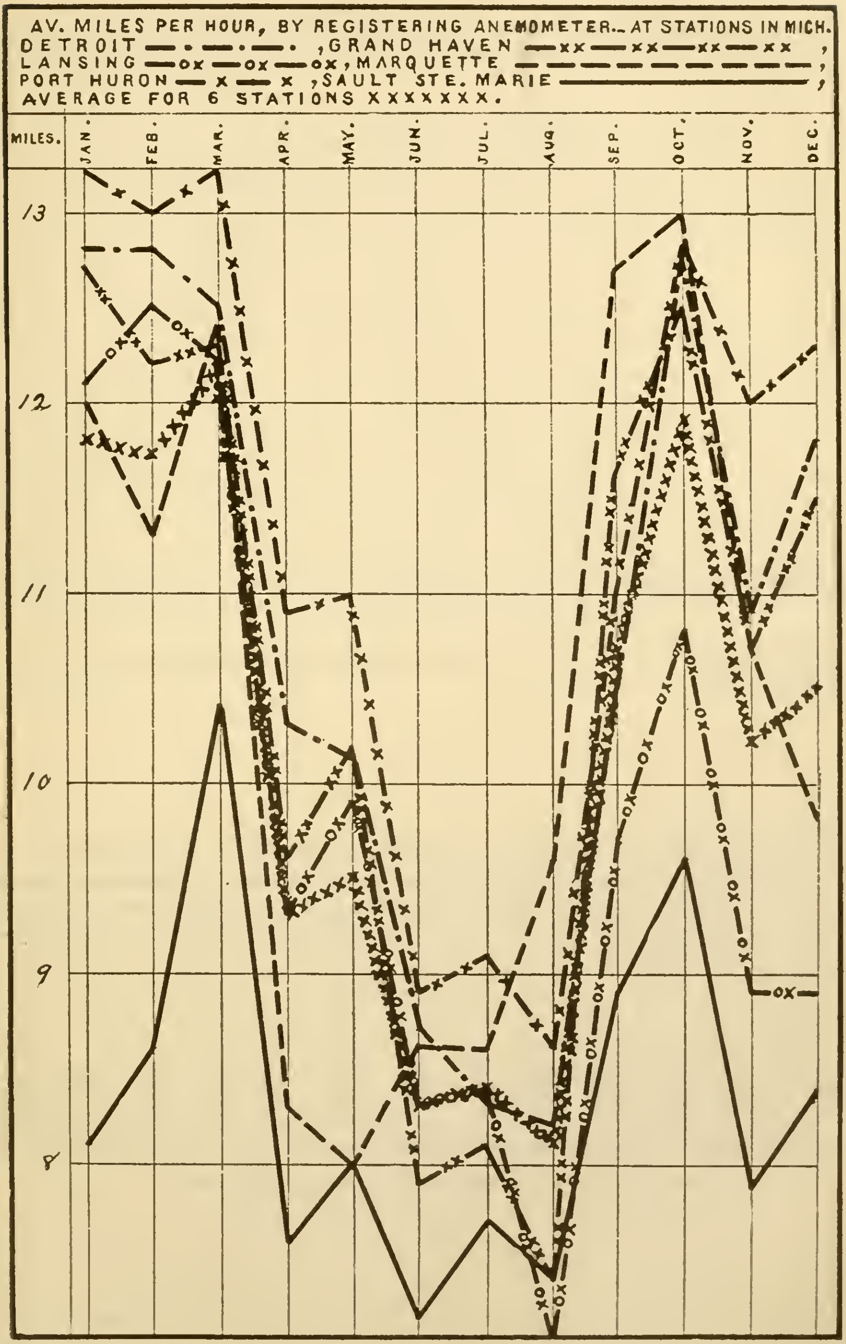
‡ Numbers in this column state the average velocity of the wind in miles per hour for periods of years ending in each case with Dec. 31, 1895. The small figures above and at the right of numbers which state the average, denote the number of years included in the average.

Graphic representations of statements made in Table XI., are given in Diagram XI.

The construction and purport of the diagrams relating to direction of wind may be explained as follows:—

In Diagrams XII., XIII., XIV. and XV., relating to the direction of the wind, the single figures or separate groups in lines are designed to indicate by the length of the lines the number and the proportion of regular observations at 7 A. M., 2 P. M. and 9 P. M. daily, at which the wind was blowing from each of the eight principal points of compass at the places and for the periods of time stated in the margin; and by the direction of the lines on the page, the direction of the wind. Each figure consists of lines drawn to a common center from some or all of the following directions on the page and indicating that at the times of observation the wind blew from points of the compass as follows: Lines toward the common center from the top of the page indicate observations that the wind was blowing from the north; from the right-hand side, observations that the wind was from the east; from the bottom of the page, that it was from the south; from the left-hand side, that it was from the west; from the upper left-hand corner, that it was from the northwest; from the upper right-hand corner, that it was from the northeast; from the lower right-hand corner, that it was from the southeast; and from the lower left-hand corner that it was from the southwest. The number of regular observations at which the wind was blowing from the direction denoted by a line as indicated by the length of that line, .01 of an inch being the unit or the length of line for one observation. The circles indicate calms, the number of regular observations at which there was no wind being denoted by the length of the *radius* of the circle drawn about the point of convergence of the lines for a given place or period of time, the length of one observation being, as before, .01 of an inch. Thus, by Diagram XII., or by Table XIV., it appears that at Ann Arbor in February, 1895, at 17 of the regular tri-daily observations for the month there was a calm; at 38 observations the wind was blowing from the west; at 7 observations, from the northwest; at 1 from the northeast, etc. For convenient study the top of these diagrams should be held toward the north. Definite numerical statements corresponding to these diagrams are given in Tables XII., XIII., and XIV. and Exhibit 34.

DIAGRAM XI.—VELOCITY OF WIND, BY MONTHS IN 1895.



[PLATE 861]

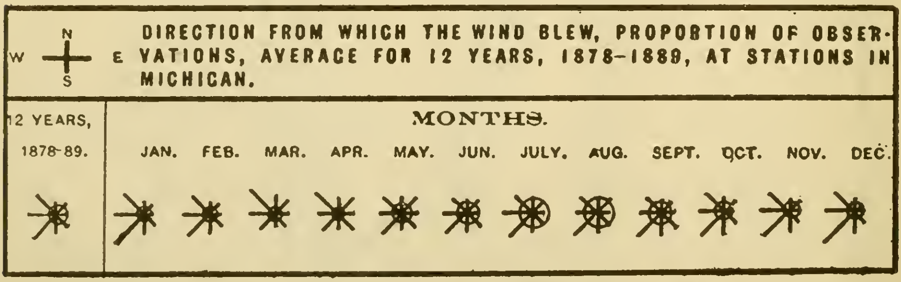
EXHIBIT 34.—Direction of Wind, 1878-89.—*Number of Observations per month (made tri-daily), at which the wind was blowing from the several (eight) points of Compass.—Annual and Monthly Averages for the 12 years, 1878-89, at Stations in Michigan.**

Points of Compass.	Average Number of Observations per Month—12 Years, 1878-89.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
All observations	91	93	85	93	90	93	90	93	93	89	92	90	93
Calm	5	4	4	4	4	5	6	8	8	6	5	4	4
North	7	6	6	10	9	8	7	8	8	6	8	6	6
Northeast	8	6	7	10	11	11	9	8	10	7	8	7	5
East	6	5	6	7	8	8	6	5	6	6	5	5	5
Southeast	9	9	9	9	11	11	10	8	9	11	9	7	8
South	10	11	10	7	8	10	11	10	10	12	12	11	11
Southwest	17	22	16	12	12	15	16	18	17	18	18	19	23
West	14	16	14	14	11	12	13	16	12	12	13	17	17
Northwest	14	15	13	19	16	13	11	13	13	12	14	15	14

* At 12 stations in 1878; 16 in 1879; 19 in 1880; 19 in 1881; 21 in 1882; 19 in 1883; 21 in 1884; 21 in 1885; 16 in 1886; 17 in 1887; 13 in 1888; and 11 in 1889.

Graphic representations of statements made in Exhibit 34 are given in Diagram XIII.

DIAGRAM XIII.—WIND, DIRECTION, IN MICH., AVERAGE 12 YEARS, 1878-1889.



*Scale, Radius .01 of One Inch to One Observation

[Plate 675.]

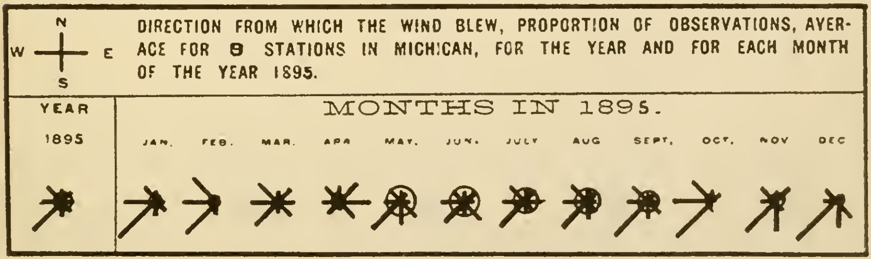
TABLE XII.—*Number of Observations per Month (at 7 A. M., 2 P. M. and 9 P. M., daily), at which the wind was blowing from each of the Eight Principal Points of Compass, during the Year and during each month of the Year 1895. Average for 9 Stations in Michigan.**

Points of Compass.	Average Number of Observations per Month, 1895.												
	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
All observations (9 stations)	89	91	82	92	89	92	85	89	90	88	92	89	92
Calm	5	4	4	3	4	8	8	7	7	6	3	4	2
North	6	6	3	6	10	6	5	7	7	4	6	6	4
Northeast	7	4	2	10	14	5	7	8	6	4	5	10	5
East	6	5	1	9	17	5	5	10	4	4	1	2	3
Southeast	8	7	2	10	11	12	14	6	7	10	2	6	12
South	9	9	7	6	3	13	7	6	10	10	7	17	15
Southwest	23	29	25	19	9	22	17	20	21	27	29	23	31
West	14	18	19	14	10	11	13	13	15	12	22	9	9
Northwest	12	10	19	15	11	10	9	12	13	12	16	12	10

* The names of observers, their places of observation, and the counties and divisions of the State in which those places are situated, are stated in Exhibit 1.

Graphic representations of statements in Table XII. are given in Diagram XIV.

DIAGRAM XIV—WIND, DIRECTION, IN MICH., YEAR AND MONTHS, 1895.



DIRECTION FROM WHICH THE WIND BLEW, PROPORTION OF OBSERVATIONS, AVERAGE FOR 9 STATIONS IN MICHIGAN, FOR THE YEAR AND FOR EACH MONTH OF THE YEAR 1895.

[PLATE 563]

TABLE XIII.—*Average Number of Observations per Month for the Year 1895, at which the wind was blowing from each of the Eight Principal Points of the Compass, at each of 9 Stations* in Michigan; also the average line for the 9 Stations.*

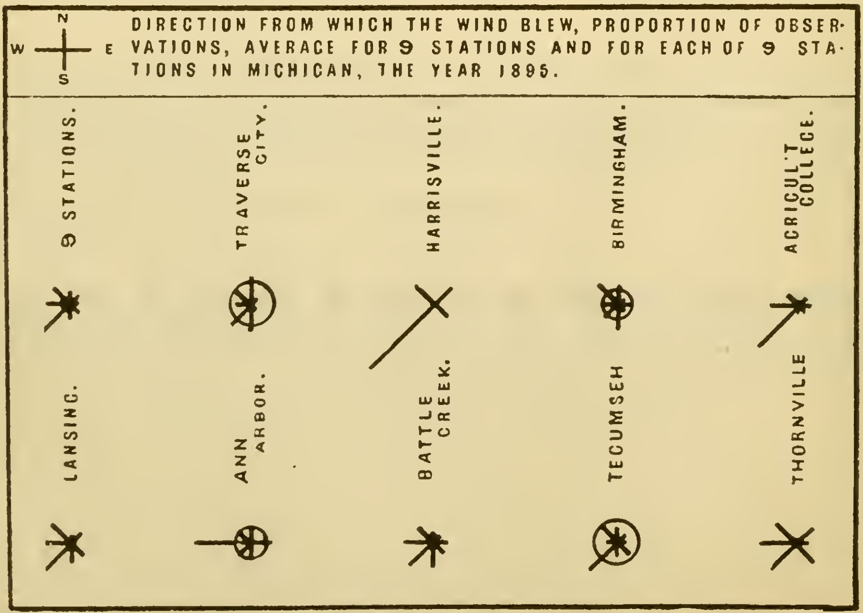
Stations in Michigan.*	Divisions of the State.†	Average Number of Observations per Month, 1895.									
		All Obs.	Calms.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.
Av. for 9 Stations	--------	89	5	6	7	6	8	9	23	14	13
Traverse City	N. W.	90	12	16	5	1	4	15	19	9	10
Harrisville	N. E.	91	0	0	12	0	11	0	51	2	15
Thornville	B. & E.	91	0	1	12	7	15	2	20	20	16
Agr'l College	C.	85	2	2	7	8	6	5	31	15	9
Lansing, S. B. of H.	C.	91	0	5	8	2	11	12	22	15	15
Ann Arbor	S. C.	91	9	6	2	12	3	10	10	31	9
Battle Creek	S. C.	91	1	6	5	9	9	14	19	17	12
Tecumseh	S. C.	91	12	8	7	6	11	9	22	6	12
Birmingham	S. E.	80	9	10	3	5	5	14	11	8	15

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 1.

† The full names of the divisions and counties in each division, are stated in Exhibit I., in a paper which follows, on weekly reports of sickness.

Graphic representations of statements in Table XIII., are given in Diagram XV.

DIAGRAM XV—WIND, DIRECTION, AT STATIONS IN MICHIGAN, 1895.



[PLATE 864]

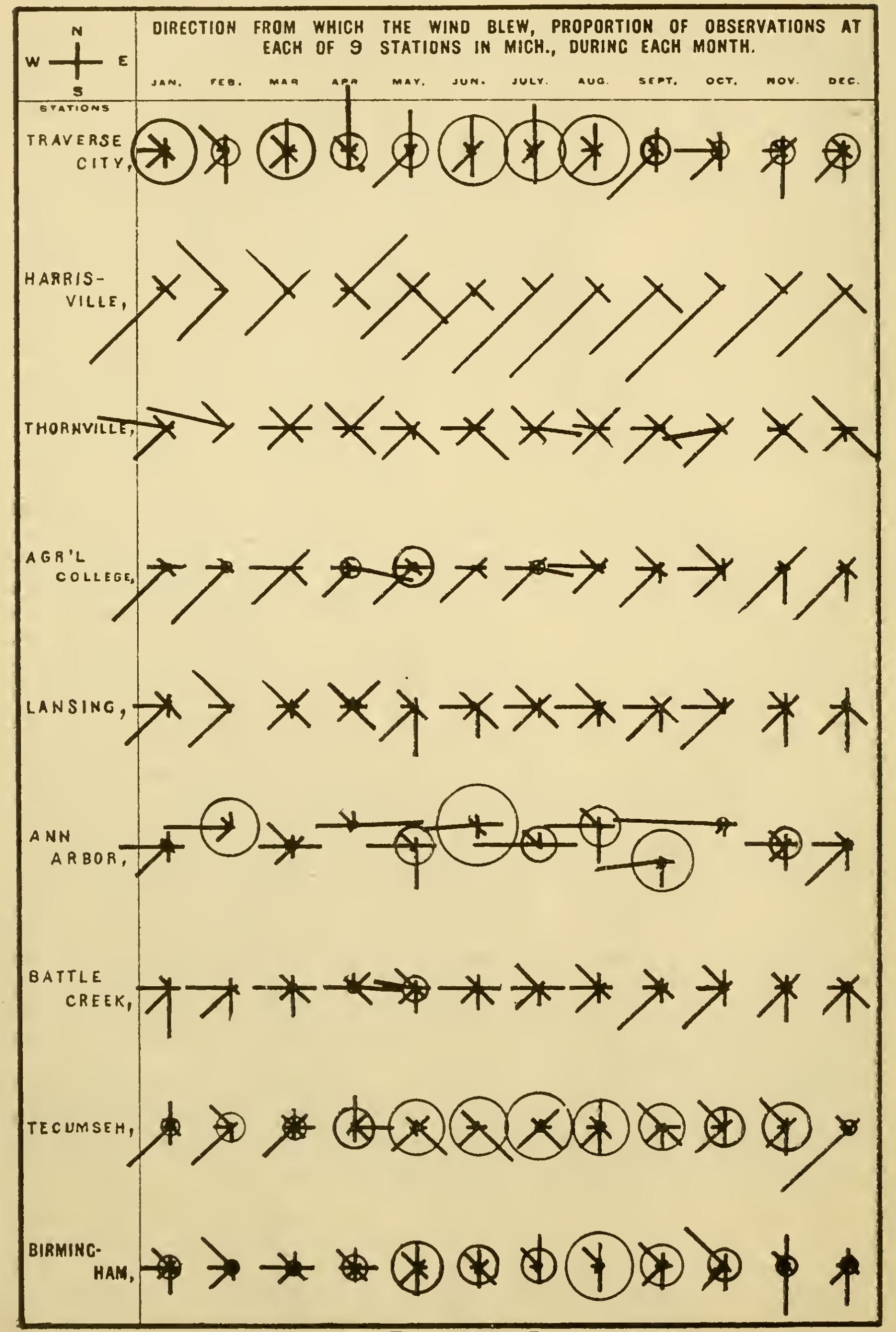
DIAGRAMS RELATING TO METEOROLOGICAL CONDITIONS.

Most of the diagrams in this paper are to be read by tracing each irregular line across the diagram from left to right, and noting at what point it intersects each of the perpendicular lines having the name of the month at the top. What station is represented by the irregular line may be learned from the head of the diagram. The degree of value denoted by the intersection may be learned by referring to the figures in the left-hand column. Thus, in Diagram I., relating to average temperature in 1895, tracing the line "— · —" representing Harrisville, it may be seen that the average temperature at Harrisville was, in January, 16.89°, in March about 23°, in August about 64°, in October about 43°, etc. Definite numerical statements of the average temperature for each month at each station may be found in Table I., and accompanying each diagram is a table giving exact numerical statements for the conditions represented. The average lines given in each table are represented in the corresponding diagram by an × line, thus × × × ×. The lines in the diagrams give more ready general comparisons of stations with each other, or of months, with each other, than is possible from the mere numerical statements. By Diagram II., it appears at a glance that the average daily range of temperature at Birmingham in 1895 was, during June, higher than at any other of the seven stations represented in that diagram, and during January was lower at Marquette. The marked agreement in the course of lines in Diagram I., representing mean monthly temperature at 8 stations, and also that the agreement is closer in September, October and November than in the other months, appear at once on reference to the diagram. The resemblance between the lines in Diagram I., relating to mean temperature by months in 1895, and those in Diagram III., relating to absolute humidity of the atmosphere for the same periods, is apparent. By Diagram X., it appears that in every month of the year the highest velocity of the wind (on an average for the month) is reached between 12 m. and 3 p. m., and that the lowest velocity occurs in the latter part of the night or in early morning, and that in 1895 at Lansing, the months of most wind were February and March. By reference to Diagram XI., it may be seen that at other stations in Michigan where records of actual miles of wind traveled were kept, March was in 1895 the month of greatest wind. These statements illustrate the reading of the diagrams for any use it may be desired to make of the tables and diagrams. The four diagrams relating to the direction of the wind are constructed on a different principle and the manner of reading them is explained on preceding pages in this article.

Diagrams XII., XIII., XIV. and XV., relating to the direction of the wind, are constructed on a plan different from that of the other diagrams.

A description of the plan of their construction, method of reading, etc., is printed on a preceding page in this article.

DIAGRAM XII—WIND, DIRECTION, AT STATIONS, BY MONTHS, 1895.



[PLATE 862]

TABLE XIV.—*Number of Observations for Months and Year 1895, at which the wind was blowing from each of the Eight Principal Points of the Compass, at 12 Stations* in Michigan; also Average Line for 9 of the said Stations from which nearly Complete Observations were received for the Year. (Observations were made at 7 A. M., 2 P. M. and 9 P. M., Daily.)*

Stations in Michigan.*	Divisions of the State.*	January.										February.										March.									
		Total.	Calm.	N.	N.E.	E	S.E.	S.	S.W.	W.	N.W	Total.	Calm.	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W	Total.	Calm	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W
Av. 9 stations†	--------	91	4	6	4	5	7	9	29	18	10	82	4	3	2	1	2	7	25	19	19	92	3	6	10	9	10	6	19	14	15
Rockland	U. P.	90	4	8	8	9	20	9	5	4	23	67	3	21	0	3	1	5	7	1	26	83	6	23	1	4	11	10	4	2	22
Traverse City	N. W.	93	20	7	3	2	8	10	14	16	13	84	8	9	2	0	2	18	18	6	21	93	16	17	4	5	8	13	14	4	12
Harrisville	N. E.	93	0	0	11	0	8	0	59	5	10	84	0	0	0	0	1	0	38	6	39	93	0	0	16	0	7	0	35	3	32
Ashton	N. C.	86	0	9	4	9	6	1	13	31	13	79	0	4	1	2	1	1	28	20	22	86	0	15	0	3	12	6	15	15	20
Thornville	B. & E	93	0	0	6	4	8	1	25	39	10	84	0	0	3	0	1	0	12	47	21	93	0	0	18	12	11	0	17	18	17
Agr'l College	C.	87	2	3	3	10	8	0	43	11	7	75	3	0	0	1	4	1	45	13	8	90	0	0	15	7	13	1	29	23	2
Lansing, S. B. of H.	C.	93	0	7	4	4	10	6	32	19	11	84	0	2	3	0	2	4	32	12	29	93	0	5	14	4	15	6	18	9	22
Albion	S. C.	93	18	1	3	6	10	3	28	15	15	84	21	3	2	3	0	0	26	12	14	93	20	4	11	3	6	5	16	9	19
Ann Arbor	S. C.	93	3	9	1	9	5	9	21	27	6	84	17	7	1	2	0	1	11	38	7	93	3	6	7	16	4	7	13	19	18
Battle Creek	S. C.	93	1	6	0	6	2	30	20	19	9	84	0	5	1	4	5	19	23	25	2	93	0	7	3	12	12	16	10	23	10
Tecumseh	S. C.	93	5	15	5	4	8	11	34	5	6	84	8	3	4	1	1	8	31	11	17	93	6	10	11	12	9	7	22	6	10
Birmingham	S. E.	84	6	7	4	5	6	15	10	17	14	74	4	3	1	3	0	8	16	15	24	87	4	9	4	11	10	4	13	20	12

* For names of observers, etc., see Exhibit 1. For names of divisions, etc., see Exhibit 1., in a paper which follows on weekly reports of sickness.

† This line includes only the 9 stations, at which observations were made tri-daily, and from which statements complete, or nearly complete, were received for every month of the year; it does not include Rockland, Ashton and Albion.

NOTE.—Graphic representations of statements for 9 lines in this table are given in Diagram XII., which is explained on a preceding page in this article.

TABLE XIV.—CONTINUED.—*Direction of Wind, Months in 1895.—Observations at which the Wind was blowing from Direction named.*

Stations in Michigan.*	Divisions of the State.*	April.										May.										June.									
		Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Total	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.
Av 9 Stations†	--------	89	4	10	14	17	11	3	9	10	11	92	8	6	5	5	12	13	22	11	10	85	8	5	7	5	14	7	17	13	9
Rockland	U. P.	------	------	----	----	----	----	--	----	----	----	85	7	22	6	19	6	12	3	4	6	89	4	2	2	16	11	16	18	10	10
Traverse City	N. W.	90	10	37	5	3	7	10	2	5	11	92	9	23	4	0	3	15	30	3	5	86	17	18	7	0	2	15	17	4	6
Harrisville	N. E.	90	0	0	44	0	15	0	14	5	12	93	0	0	13	0	27	0	40	1	12	90	0	0	8	0	15	3	56	0	8
Ashton	N. C.	86	0	5	9	21	16	0	13	4	18	84	0	14	1	1	6	1	46	6	9	84	0	1	0	3	10	2	38	16	14
Thornville	B. & E	90	0	0	26	8	19	0	7	10	20	93	0	2	5	3	21	6	25	18	13	90	0	1	15	7	26	0	13	19	9
Agr'l College	C.	85	6	0	1	35	5	0	23	11	4	83	12	3	3	9	6	2	30	11	7	68	0	0	8	7	9	1	28	12	3
Lansing, S. B. of H.	C.	90	0	5	21	9	18	0	12	7	18	93	0	5	1	3	10	28	26	7	13	90	0	2	11	2	16	16	10	21	12
Albion	S. C.	90	30	3	20	2	14	2	8	4	7	93	31	8	1	3	9	3	24	9	12	------	------	----	----	----	----	--	----	----	----
Ann Arbor	S. C.	90	2	8	2	38	2	2	4	21	11	93	11	4	0	11	1	25	4	27	10	90	22	5	0	15	7	6	0	30	5
Battle Creek	S. C.	90	3	8	11	27	14	2	1	17	7	93	7	4	1	8	8	14	13	23	15	90	2	7	1	13	12	12	12	22	9
Tecumseh	S. C.	90	12	17	9	22	11	8	6	1	4	93	15	4	9	6	23	6	19	4	7	90	47	3	3	4	27	1	15	7	13
Birmingham	S. E.	82	7	11	4	11	10	8	8	2	14	91	15	12	6	6	8	17	14	1	12	74	12	9	6	1	13	11	5	5	12

*† For these references see foot-notes at bottom of first page of this table.

NOTE.—Graphic representations of statements for 9 lines in this table are given in Diagram XII., which is explained on a preceding page in this article.

TABLE XIV.—CONTINUED.—*Direction of Wind, Months in 1895.—Observations at which the Wind was blowing from Direction named.*

Stations in Michigan.*	Divisions of the State *	July.										August.										September.									
		Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W	Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N W	Total.	Calm.	N.	N. E.	E	S. E.	S.	S. W	W.	N. W
Av. 9 stations†	--------	89	7	7	8	10	6	6	20	13	12	90	7	7	6	4	7	10	21	15	13	88	6	4	4	4	10	10	27	12	12
Rockland	U. P.	74	2	2	3	8	10	18	12	14	5	88	2	1	1	17	7	16	23	15	6	81	2	2	4	7	20	23	14	9	0
Traverse City	N. W.	93	17	26	7	0	1	19	10	5	8	93	19	15	6	1	3	11	20	8	10	90	8	12	1	0	5	12	39	4	9
Harrisville	N. E.	93	0	0	13	1	2	0	65	2	10	93	0	0	5	0	11	0	68	0	9	90	0	0	6	0	19	0	52	3	10
Ashton	N. C.	75	0	9	4	3	14	1	6	18	20	90	0	1	1	0	4	2	16	38	28	90	0	7	0	0	12	12	35	10	14
Thornville	B. & E	93	0	1	15	26	8	0	13	11	19	93	0	0	19	8	14	2	21	13	16	90	0	0	11	4	17	3	28	16	11
Agr'l College	C.	84	4	0	8	20	1	0	27	18	6	81	0	2	7	5	5	1	20	27	14	87	0	4	4	1	6	8	31	14	19
Lansing, S. B of H.	C.	93	0	5	10	1	16	6	19	19	17	93	0	3	5	2	13	11	17	24	18	90	0	1	7	1	12	13	27	21	8
Albion	S C.	------	------	----	----	----	----	--	----	----	--	------	------	----	----	----	----	--	----	----	----	------	------	----	----	----	----	--	----	----	----
Ann Arbor	S C.	93	10	8	1	20	1	3	2	37	11	93	11	5	1	9	2	21	1	30	13	90	17	4	2	8	3	14	4	35	3
Battle Creek	S. C.	93	1	3	4	14	9	10	18	16	18	93	0	8	4	7	10	10	19	17	18	90	0	4	4	3	10	9	35	11	14
Tecumseh	S. C.	93	18	5	14	7	18	3	18	4	6	93	16	15	4	3	8	15	17	7	8	90	13	2	1	10	15	13	13	4	19
Birmingham	S. E.	63	10	18	2	0	0	10	4	3	16	75	19	12	2	3	0	15	4	6	14	79	12	8	2	5	1	14	15	3	19

*† For these references see foot-notes at bottom of first page of this table.

NOTE.—Graphic representations of statements for 9 lines in this table are given in Diagram XII., which is explained on a preceding page in this article.

TABLE XIV.—CONCLUDED.—*Direction of Wind, Months in 1895.—Observations at which the Wind was blowing from Directions named.*

Stations in Michigan.*	Divisions of the State.*	October.										November.										December.									
		Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.	Total.	Calm.	N.	N. E.	E.	S. E.	S.	S. W.	W.	N. W.
Av. 9 Stations†	--------	92	3	6	5	1	2	7	29	22	16	89	4	6	10	2	6	17	23	9	12	92	2	4	5	3	12	15	31	9	10
Rockland	U. P.	85	0	1	0	5	14	20	38	3	4	86	0	3	4	13	22	12	13	7	12	86	0	2	5	9	15	14	32	5	4
Traverse City	N. W.	88	5	10	2	0	2	11	23	25	10	90	7	8	10	0	4	27	16	11	7	93	10	6	5	3	6	19	24	12	8
Harrisville	N. E.	93	0	0	5	0	2	0	73	0	13	90	0	0	15	0	6	0	54	1	14	93	0	1	5	0	18	0	54	2	13
Ashton	N. C.	93	0	0	0	0	5	2	31	28	27	90	0	14	3	0	11	16	19	6	21	------	------	----	----	----	----	--	----	----	----
Thornville	B. & E.	93	0	0	9	0	5	0	33	33	13	90	0	3	12	1	18	4	24	10	18	90	0	0	0	7	26	7	19	7	27
Agr'l College	C.	92	0	6	9	1	2	6	23	25	20	90	0	1	18	4	2	20	35	5	5	93	0	1	8	1	9	19	42	6	7
Lansing, S. B. of H.	C.	93	0	6	7	1	3	4	33	24	15	90	1	8	9	1	7	22	19	10	13	93	0	11	3	1	15	26	22	10	5
Albion	S. C.	93	6	2	9	1	3	9	35	16	13	90	6	5	11	4	6	14	25	11	8	93	0	8	5	6	6	29	28	5	6
Ann Arbor	S. C.	93	3	2	1	7	1	6	6	62	5	90	9	6	4	7	2	15	13	22	12	93	2	4	3	4	4	15	32	20	9
Battle Creek	S. C.	93	0	10	5	0	3	10	32	15	18	90	0	7	11	5	9	19	23	6	10	93	0	4	9	3	17	20	21	11	8
Tecumseh	S. C.	93	12	11	5	0	1	11	23	9	21	90	13	5	7	1	2	17	17	6	22	93	4	0	8	2	4	2	51	4	9
Birmingham	S. E.	88	9	8	0	0	3	14	18	4	32	84	6	18	3	3	3	28	6	6	11	83	5	10	1	6	8	23	15	7	5

*† For these references see foot-notes at bottom of first page of this table.

NOTE.—Diagram XII. exhibits lines showing, by months, directions of wind at each of 9 stations in this table; for each month and station the diagram represents the figures given in this table for the same month and stations; it is explained on a preceding page in this article.

TABLE XV.—*Average Daily Range of Atmospheric Pressure (as determined from three daily observations) for Months and Year 1895, at 12 Stations, also average line for 9 stations* in Michigan—Stations arranged in order by Latitude, those farthest North first.*

Stations in Michigan.*	Average Daily Range of Barometer—Year and Months, 1895.														
	Norm. †	1894.	1895.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. for 9 Stations ‡	------	------	.201	.316	.266	.238	.152	.150	.117	.157	.135	.193	.241	.212	.236
Rockland	------	.240	¶	[h] .293	[i] .296	[h] .242	----	[g] .172	[d] .130	[h] .148	[f] .142	[h] .210	[h] .311	[f] .216	[g] .263
Traverse City	.215 ^{14}	.214	.204	.323	.266	.223	.156	.161	[i] .109	.173	[b] .132	[e] .203	[d] .266	.189	.247
Harrisville	------	------	.219	.330	.314	.238	.168	.173	.145	.172	.151	.204	.272	.209	.253
Ashton	------	------	§	.277	.269	.207	.130	.132	.121	.145	.117	.184	.198	.145	------
Thornville	.214 ^{12}	.205	.205	.316	.259	.251	.156	.154	.126	.163	.143	.193	.239	.228	.231
Agr'l College	.199 ^{13}	.174	.190	.290	.237	.238	.137	.137	.107	.150	.112	.199	.221	.201	.253
Lansing, S. B. of H.	.205 ^{14}	.198	.197	.308	.258	.235	.145	.155	.117	.152	.139	.190	.236	.198	.228
Birmingham	.209 ^{9}	.199	.209	.295	[d] .273	[c] .251	[b] .171	[b] .151	[e] .117	[b] .171	[c] .156	[d] .200	.238	[b] .248	.233
Ann Arbor	.205 ^{14}	.193	.205	.387	.268	.232	.147	.148	.116	.147	.127	.182	.241	.218	.247
Albion	------	------	‖	.296	.259	.239	.136	[a] .132	------	------	------	------	.220	.193	.215
Tecumseh	.195 ^{4}	.186	.187	.265	.272	.233	.142	.129	.107	.143	.115	.183	.222	.209	.218
Adrian	.196 ^{2}	.196	.196	.326	.250	.241	.150	.145	.112	.146	.138	.184	.234	.209	.213

* The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 1. The average atmospheric pressure at each of these stations, by months, in 1895, is given in Table XVII.

† Numbers in this column state the average daily range of atmospheric pressure for periods of years ending in each case with Dec. 31, 1895. The small figures above and at the right of numbers which state the average daily range, denote the number of years included in the average.

‡ Not including Rockland, Ashton and Albion.

¶ The average for 11 months is .220. § For 11 months, .175. ‖ For 8 months, .211.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 26 days. f For 25 days. g For 24 days. h For 22 days. i For 21 days.

NOTE.—The latitude and elevations of some of the stations in Table XV. are stated in Exhibit 2.

The daily range is found by subtracting the lowest observation from the highest observation, 7 A. M. to 7 A. M.

TABLE XVI.—*Range of Atmospheric Pressure (as determined from 3 Daily Observations) for the Year and for each Month and for the Average Month of the Year 1895, at 9 and at each of the 9 Stations, and Average Line for 9 Stations in Michigan; also the Norm.—Average Monthly range for a series of years. Stations named in order by Latitude, those farthest North first.*

Stations in Michigan.	Range of Barometer.—Year and Months, 1895.															
	Norm. †	1894.	1895.	Av. Month.	Jan.	Feb.	Mar.	Apr.	May	Jun.	July.	Aug.	Sept.	Oct	Nov.	Dec.
For 9 Stations ‡	------	------	1.893	1.368	1.893	1.651	1.594	1.378	1.108	.970	1.197	.949	1.101	1.498	1.639	1.432
Av. for 9 Stations ¶ -----	------	------	1.462	.888	1.446	1.225	.916	.925	.667	.562	.720	.527	.630	1.039	.968	1.000
Rockland -------	------	------	------	§	g .452	i 1.331	h .778	----	e .770	c .624	h .649	f .496	h .741	g .930	e .800	e 1.027
Traverse City---	.962^{14}	1.560	1.759	.903	1.759	1.314	.952	.777	.741	j .573	.714	b .542	e .686	d .993	.885	.903
Harrisville------	------	------	1.610	.942	1.562	1.353	.986	.932	.762	.632	.751	.648	.702	1.050	.836	1.087
Ashton-----------	------	------	------	‖	1.402	1.309	.762	.664	.571	.570	.615	d .746	b .627	.838	.723	-----
Thornville-------	.949^{12}	1.496	1.426	.974	1.426	1.173	1.146	.955	.675	.698	.940	.498	.697	1.073	1.264	1.145
Agr'l College----	.898^{13}	1.400	1.354	.804	1.354	1.173	.823	.839	.600	.508	.586	.514	.626	.946	.781	.902
Lansing, S. B. of H.---------	.911^{14}	1.525	1.415	.869	1.415	1.268	.849	.932	.662	.531	.679	.601	.657	.953	.981	.903
Birmingham----	.923^{9}	1.508	1.455	.892	1.356	1.164	.877	1.067	.659	.552	.713	.504	.662	1.056	.983	1.112
Battle Creek----	------	1.150	------	**	1.344	d 1.205	b .839	b .912	a .620	d .517	-----	-----	-----	-----	-----	-----
Ann Arbor------	.909^{14}	1.479	1.405	.902	1.403	1.289	.862	.943	.667	.539	.682	.515	.650	1.085	1.084	1.104
Albion ----------	------	------	------	††	1.351	1.208	.824	.870	.647	-----	-----	-----	-----	.946	.952	.829
Tecumseh-------	.880^{4}	1.462	1.335	.836	1.335	1.262	.895	.920	.576	.492	.755	.437	.630	.901	.954	.875
Adrian ---------	.850^{2}	1.506	1.402	.869	1,402	1.030	.851	.962	.664	.532	.659	.486	.630	1.291	.948	.970

† Numbers in this column state the average monthly range of atmospheric pressure for a period of years ending in each case with December 31, 1895. The small figures above and at the right of the numbers which state the average, denote the number of years included in the average.

‡ Represents the difference between the highest of 9 stations and the lowest of 9 stations for year and for each month of year, not including Ashton, Albion, Rockland, and Battle Creek.

¶ Represents sum of ranges at 9 stations divided by 9.

§ The average for 11 months is .782. ‖ For 11 months, .802. ** For 6 months, .906. †† For 8 months, .953.

a, b, c. In the columns from January to December, inclusive, the letters a, b, c, etc., stand directly above the numbers from which they refer to notes below.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 26 days. f For 25 days. g For 24 days. h For 23 days. i For 22 days. j For 21 days.

NOTE.—The statements in the star (*) foot-note to Table XV. apply also to Table XVI.

EXHIBIT 35.—*Average Atmospheric Pressure, by Year and Months, in 1895, Compared with Annual and Monthly Averages for 1894, and for the 18 years, 1877–94. These Averages are for Groups of Several Stations in Michigan.**

Years, etc.	Average Atmospheric Pressure.—Inches of Mercury.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 18 years, 1877-94.	29.137	29.158	29.166	29.133	29.120	29.093	29.092	29.114	29.139	29.177	29.154	29.147	29.153
1894 (10 stations)	29.053	29.076	29.087	29.042	29.064	28.995	29.035	29.063	29.082	29.089	28.961	29.060	29.082
1895 (9 stations)	29.125	29.044	29.126	29.119	29.125	29.135	29.184	29.125	29.077	29.136	29.152	29.201	29.072
In 1895 Greater than Av. for 18 years, 1877-94	------	------	------	------	.005	.042	.092	.011	------	------	------	.054	------
In 1895 Less than Av. for 18 years, 1877-91	.012	.114	.010	.014	------	------	------	------	.062	.041	.002	------	.081
In 1895 Greater than in 1894	.072	------	.039	.077	.061	.140	.149	.062	------	.047	.191	.141	------
In 1895 Less than in 1894	------	.032	------	------	------	------	------	------	.005	------	------	------	.010

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* Woodmere Cemetery (near Detroit) for 1877-79; Mendon for 1877-78, 1881-83; Benton Harbor for 1877-78; Ypsilanti for 1877, 1879; Otisville for 1878-80, 1882; Washington for 1879-80, 1882-83; Nirvana for 1879 and in 1880 to April 25 inclusive; Reed City for 1880 after April 25 and 1881-85; Hastings for 1882; Hillsdale for 1882-83; Manistique for 1884-85; Mackinaw City for 1884-87; Ionia for 1884-85; Swartz Creek for 1885; Port Austin for 1883-84, 1888-89; Marquette for 1879-84, 1886-87; Escanaba for 1880, 1882-87; Alpena, Grand Haven, Port Huron for 1879-87; Detroit for 1878-87; Kalamazoo for 1877-82, 1885-89; Alma for 1890; Gulliver Lake for 1888-90, 1892; Marshall for 1883-92; Albion for 1890-91; Rockland for 1891-92, 1894; Harrisville for 1882, 1885-92; Tecumseh for 1879-80, 1882-85, 1890, 1892-94; Birmingham for 1887-94; Battle Creek for 1877-80, 1882, 1888-89, 1891-94; Lansing for 1879-1894; Agr'l College for 1877, 1881-94; Thornville for 1880-81, 1884-94; Ann Arbor for 1881-94; Traverse City for 1882-94; Adrian for 1894.

EXHIBIT 36.—*Comparisons of the Average Atmospheric Pressure during the Year and during each Month of the Year 1895, with Averages for the 20 Years, 1875–94, and for the Year 1894. Corrected for Temperature and for Instrumental Error. Observations made at 7 A. M., 2 P. M. and 9 P. M., Daily, by Prof. R. C. Kedzie, at the State Agricultural College, near Lansing, Michigan.*

Years, etc.	Average Atmospheric Pressure.—Inches of Mercury.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 20 years, 1875-94	29.066	29.073	29.073	29.038	29.043	29.030	29.041	29.068	29.086	29.114	29.076	29.077	29.078
1894	29.038	28.989	29.016	29.008	29.055	28.987	29.039	29.064	29.085	29.103	28.982	29.056	29.075
1895	29.060	28.953	28.992	29.051	29.049	29.085	29.138	29.089	29.037	29.145	29.071	29.109	28.995
In 1895 Greater than Av. for 20 years, 1875-94	------	------	------	.013	.006	.055	.097	.021	------	.031	------	.032	------
In 1895 Less than Av. for 20 years, 1875-94	.006	.120	.081	------	------	------	------	------	.049	------	.005	------	.083
In 1895 Greater than in 1894	.022	------	------	.043	------	.098	.099	.025	------	.042	.089	.053	------
In 1895 Less than in 1894	------	.034	.024	------	.006	------	------	------	.048	------	------	------	.080

TABLE XVII.—*Average Atmospheric Pressure for Months and Year 1895, at 13 Stations in Michigan; also Average line for 9 Stations, as indicated by the height, in inches, of Mercury in the Barometer. Corrected for Temperature.—Reduced to 32° F. (for some stations not corrected for instrumental errors*).—Average of Observations made Daily at 7 A. M., 2 P. M., and 9 P. M. by observers† for the State Board of Health.*

Stations in Michigan.†	Divisions of the State.‡	Inches of Mercury.—Atmospheric Pressure.													
		Years.		Months, 1895.											
		Norm.‖	1895.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 9 Stations¶	....	....	29.125	29.044	29.126	29.119	29.125	29.135	29.184	29.125	29.077	29.136	29.152	29.201	29.072
Rockland	U. P.	....	**	[g] 28.546	[i] 28.649	[h] 28.672	....	[e] 28.630	[c] 28.696	[h] 28.690	[f] 28.629	[i] 28.613	[i] 28.669	[e] 28.714	[f] 28.535
Traverse city	N. W.	29.325[14]	29.310	29.238	29.326	29.328	29.351	29.303	[j] 29.381	29.316	[b] 29.248	[e] 29.268	[d] 29.311	29.376	29.273
Harrisville	N. E.	....	29.331	29.241	29.311	29.342	29.390	29.348	29.391	29.334	29.281	29.317	29.301	29.412	29.298
Ashton	N. C.	....	††	28.577	28.620	28.634	28.683	28.660	28.700	28.672	[d] 28.632	[b] 28.675	28.678	28.741	....
Thornville	B. & E.	28.950[16]	28.942	28.829	28.910	28.913	28.940	28.919	28.998	28.948	28.895	28.958	28.967	29.045	28.946
Agricultural College	C.	29.079[14]	29.060	28.953	28.992	29.051	29.049	29.085	29.138	29.089	29.037	29.145	29.071	29.109	28.995
Lansing, S. B. of H.	C.	29.059[17]	29.078	28.981	29.087	29.068	29.082	29.092	29.135	29.082	29.036	29.096	29.092	29.152	29.037
Adrian	S. C.	29.130[2]	29 125	29.069	29.166	29.120	29.101	29.129	29.165	29.099	29.063	29.135	29.146	29.201	29.101
Albion	S. C.	....	‡‡	28.699	28.801	28.787	28.745	28.778	....	....	....	....	28.776	28.828	28.732
Ann Arbor	S. C.	29.031[15]	29.014	28.959	29.049	29.022	28.961	29.044	29.093	29.035	28.990	29.054	29.217	29.108	29.000
Battle Creek	S. C.	....	§§	29.009	29.117	29.080	29.055	29.067	29.112	29.111	....	....	....	....	....
Tecumseh	S. C.	29.131[4]	29.151	29.110	29.176	29.147	29.137	29.159	29.197	29.143	29.094	29.160	29.155	29.218	29.121
Birmingham	S. E.	29.112[9]	29.083	29.018	[d] 29.114	[b] 29.082	[b] 29.113	[a] 29.108	[d] 29.162	[b] 29.079	[b] 29.053	[d] 29.094	29.112	[b] 29.182	28.873

* A correction has been made for instrumental error of barometer at Agricultural College; .013 has been subtracted from each monthly average during the year 1895 At Ann Arbor .004 has been added to each monthly average. For other stations the instrumental error of barometer is not known.

† The names of observers, their places of observation, and the counties in which these places are situated, are stated in Exhibit 1.

‡ The full names of divisions and the counties in each division are stated in Exhibit 1., in a paper which follows, on weekly reports of sickness.

‖ Numbers in this column state the average annual atmospheric pressure for periods of years ending in each case with December 31, 1895. The small figures at the right of the numbers which state the average, denote the number of years included in the average.

¶ This line is an average for 9 stations, at which observations were made tri-daily, and from which reports, nearly complete, were received for every month in the year. It does not include Rockland, Ashton, Albion, and Battle Creek. Green's standard barometer was used at all the 13 stations for 1895.

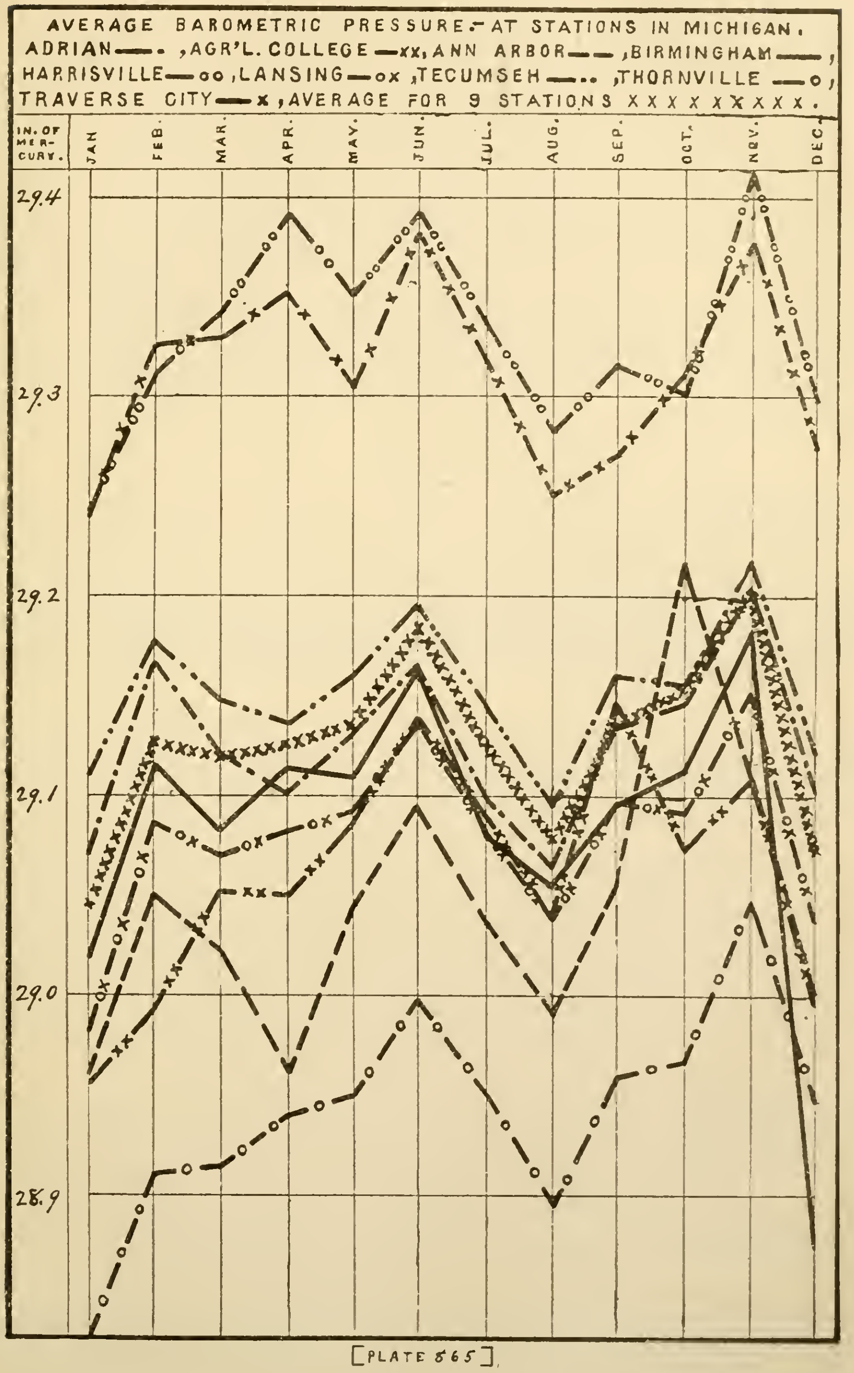
** The average for 11 months is 28.640. †† For 11 months, 28.661. ‡‡ For 8 months, 28.768. §§ For 7 months, 29.079.

NOTE.—Computations of monthly averages for the year 1895 were furnished by the observers at Albion and Ann Arbor. The remainder of the computations were made at the office of the State Board of Health.

a For 30 days. b For 29 days. c For 28 days. d For 27 days. e For 26 days. f For 25 days. g For 24 days. h For 23 days. i For 22 days. j For 21 days.

The lines for 9 stations in this table are graphically represented in Diagram XVI.

DIAGRAM XVI.—ATMOSPHERIC PRESSURE, BY MONTHS, IN 1895.



[PLATE 565]

EXHIBIT 37.—*Average Daily Range of Atmospheric Pressure, by Year and Months, in 1895, compared with Annual and Monthly Averages for 1894, and for the 13 Years, 1882-94. These Averages are for Groups of Several Stations in Michigan.**

Years, etc.	Average Daily Range of Barometer.—Year and Months, 1895.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 13 years, 1882-94	.212	.304	.309	.257	.222	.167	.136	.125	.130	.163	.210	.251	.271
1894 (10 stations)	.203	.293	.290	.221	.217	.172	.124	.109	.114	.155	.230	.267	.244
1895 (9 stations)	.201	.316	.266	.238	.152	.150	.117	.157	.135	.193	.241	.212	.236
In 1895 Greater than Av. for 13 years, 1882-94	------	.012	------	------	------	------	------	.032	.005	.030	.031	------	------
In 1895 Less than Av. for 13 years, 1882-94	.011	------	.043	.019	.070	.017	.019	------	------	------	------	.039	.035
In 1895 Greater than in 1894	------	.023	------	.017	------	------	------	.048	.021	.038	.011	------	------
In 1895 Less than in 1894	.002	------	.024	------	.065	.022	.007	------	------	------	------	.055	.008

*Port Austin for 1883-84, 1888-89; Kalamazoo for 1886-89; Mackinaw City for 1884-87; Reed City for 1882-85; Washington, Mendon for 1883; Manistique, Ionia for 1884-85; Swartz Creek for 1885; Marquette for 1882-84, 1886-87; Escanaba, Grand Haven for 1882-87; Alpena, Port Huron, Detroit for 1883-87; Alma for 1890; Albion for 1890-91; Gulliver Lake for 1888-90, 1892; Marshall for 1883-92; Battle Creek for 1888-89, 1892-94; Harrisville for 1885-92; Traverse City, Lansing, Ann Arbor for 1882-94; Agr'l College for 1883-94; Thornville for 1884-94; Rockland for 1891-92, 1894; Birmingham for 1887-94; Tecumseh for 1882-85, 1890, 1892-94; Adrian for 1894.

EXHIBIT 38.—*Range of Atmospheric Pressure, by Year and Months, in 1895, compared with Annual and Monthly Averages for 1894, and for the 13 Years, 1882-94. These Averages are for Groups of several Stations in Michigan.**

Years, etc.	Range of Barometer.—Year and Months, 1895.												
	Annual Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 13 years, 1882-94	.967	1.272	1.344	1.143	1.058	.814	.717	.586	.606	.802	1.015	1.128	1.150
1894 (9 stations)	.840	1.050	1.447	.799	.866	.873	.644	.411	.465	.680	.752	1.150	.947
1895 (9 stations)	.888	1.446	1.225	.916	.925	.667	.562	.720	.527	.660	1.039	.968	1.000
In 1895 Greater than Av. for 13 years, 1882-94	------	.174	------	------	------	------	------	.134	------	------	.024	------	------
In 1895, Less than Av. for 13 years, 1882-94	.079	------	.119	.227	.133	.147	.155	------	.079	.142	------	.160	.150
In 1895 Greater than in 1894	.048	.396	------	.117	.059	------	------	.309	.062	------	.287	------	.053
In 1895 Less than in 1894	------	------	.222	------	------	.206	.082	------	------	.020	------	.182	------

*Reed City for 1882-85; Port Austin for 1883-84, 1888-89; Washington, Mendon for 1883; Manistique, Ionia for 1884-85; Mackinaw City for 1884-87; Swartz Creek for 1885; Marquette for 1882-84, 1886-87; Escanaba, Grand Haven for 1882-87; Alpena, Port Huron, Detroit for 1883-87; Kalamazoo for 1888-89; Gulliver Lake for 1888-90, 1892; Marshall for 1883-92; Albion for 1890-91; Rockland for 1892; Harrisville for 1885-92; Tecumseh for 1882-85, 1892-94; Battle Creek for 1888-89, 1891-94; Traverse City, Lansing, Ann Arbor for 1882-94; Agr'l College for 1883-94; Thornville for 1884-94; Birmingham for 1887-94; Adrian for 1894.

SUNSHINE AND CLOUDS.

On the back of each blank register supplied by this Board to observers, on which they are to register meteorological data, is a statement that "One observer has reported a record of days 'all or nearly all cloudy' and days 'all or nearly all sunshine.' The State Board of Health would be glad to have such a report from all observers who can conveniently make it. Memoranda may be made in a column headed 'cloudy or sunny,' days more than 80 per cent of clouds being marked with the abreviation 'C,' indicating *cloudy*, and days with less than 20 per cent of clouds with an 'S,' indicating *sunshine*.

The following are statements of the days in each month which were reported "Sunny," "Clear," "Fair," "Partly cloudy," and "Cloudy," by observers at stations in Michigan, except Thornville, concerning which notes are given explaining the method of statement.

ROCKLAND.

JANUARY.—Sunny, 2, 4, 8, 9, 10, 14, 15, 16, 17, 28, 30–11 days. Cloudy, 1, 3, 5, 6, 7, 11, 12, 13, 18, 19, 20. 21, 22, 23, 24, 25, 26, 27, 29, 31—20 days.

FEBRUARY.—Sunny, 1, 2, 3, 4, 5, 6, 9, 14, 15, 16, 19, 23, 24, 25, 26, 27, 28–17 days. Cloudy, 7, 8, 10, 11, 12, 13, 17, 18, 20, 21, 22—11 days.

MARCH.—Sunny, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 24, 26, 27, 29–24 days. Cloudy, 11, 22, 23, 25, 28, 30, 31—7 days.

APRIL.—Sunny, 1, 2, 3, 4, 8, 9, 10, 21, 23, 24, 25, 26, 27, 28—14 days. Cloudy, 5, 6, 7, 11, 22–5 days.*

MAY.—Sunny, 1, 2, 3, 4, 5, 7, 8, 9, 13, 14, 16, 17, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29, 31–23 days. Cloudy, 6, 10, 11, 12, 15, 18, 25, 30—8 days.

JUNE.—Sunny, 1, 3, 5, 6, 7, 8, 13, 14, 15, 16, 17, 18, 19, 20, 22, 24, 27, 28—18 days. Cloudy, 2, 4, 9, 10, 11, 12, 21, 23, 25, 26, 29, 30–12 days.

JULY.—Sunny, 1, 2, 3, 4, 6, 7, 9, 10, 12, 13, 14, 15, 16, 17, 20, 22, 23, 24, 25, 27, 28, 29, 30, 31—24 days. Cloudy, 5, 8, 11, 18, 19, 21. 26–7 days.

AUGUST.—Sunny, 1, 3, 4, 7, 10, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 23, 24, 26, 28, 29, 30, 31—22 days. Cloudy, 2, 5, 6, 8. 9, 11, 22, 25, 27—9 days.

SEPTEMBER.—Sunny, 1, 2, 3, 4, 6, 7, 9, 10, 12, 14, 16, 18, 19, 23, 29, 30—16 days. Cloudy, 5, 8, 11, 13, 15, 17, 20, 21, 22, 24, 25, 26, 27, 28—14 days.

OCTOBER.—Sunny, 1, 2, 3, 4, 5, 12, 13, 16, 17, 24, 25, 26 –12 days. Cloudy, 6, 7, 8, 9, 10, 11, 14, 15, 18, 19, 20, 21, 22, 23, 27, 28, 29, 30, 31—19 days.

NOVEMBER.—Sunny, 1, 2, 3, 4, 5, 6, 10, 11, 12, 23—10 days. Cloudy, 7, 8. 9, 13, 14, 15, 16, 17, 18. 19, 20, 21, 22. 24, 25, 26, 27, 28, 29, 30–20 days.

DECEMBER.—Sunny, 14, 18, 23, 26, 27—5 days. Cloudy, 1, 2, 3, 4, 5. 6, 7, 8, 9, 10, 11. 12, 13, 15, 16, 17, 19, 20, 21, 22, 24, 25, 28, 29, 30, 31—26 days.

ASHTON.

JANUARY.—Sunny, 8, 9, 14, 15, 16, 19—6 days. Cloudy, 1, 2, 3. 4, 5, 6, 7, 10, 11, 12, 13, 17, 18, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31—25 days.

FEBRUARY.—Sunny, 2, 5, 10, 14, 15, 16, 19, 23, 24, 25, 26–11 days. Cloudy, 1, 3, 4, 6, 7, 8, 9, 11, 12, 13, 17, 18, 20, 21, 22, 27, 28—17 days.

MARCH.—Sunny, 1, 2, 6, 7, 8, 10, 11, 14, 16, 17, 18, 19, 20, 21, 22, 27, 28, 29, 30–19 days. Cloudy, 3, 4, 5, 9, 12, 13, 15, 23, 24, 25, 26, 31–12 days.

APRIL.—Sunny, 2, 3, 4, 5, 9, 10, 13, 15, 16, 17, 18, 19, 20, 22, 23, 24, 25, 27, 28, 29, 30—21 days. Cloudy, 1, 6, 7, 8, 11, 12, 14, 21, 26—9 days.

MAY.—Sunny, 1, 2, 3, 4, 5, 6, 7, 8, 9, 16, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31—20 days Cloudy, 10, 11, 12, 13, 14, 15, 17, 18, 19, 20, 21—11 days.

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* No record for the rest of the month.

JUNE.—Sunny, 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 13, 14, 15, 16, 17, 19, 20, 21, 22, 23, 24, 25, 27, 28, 29, 30—26 days. Cloudy, 5, 12, 18, 26—4 days.

JULY.—Sunny, 1, 2, 3, 4, 5, 6, 7, 9, 13, 14, 17, 18, 19, 20, 21, 22, 23, 24, 25, 27, 28, 30, 31—23 days. Cloudy, 8, 10, 11, 12, 15, 16, 26, 29—8 days.

AUGUST.—Sunny, 1, 3, 4, 7, 9, 10, 11, 12, 13, 15, 16, 17, 18, 19, 20, 21, 24, 25, 26, 29, 30, 31—22 days. Cloudy, 2, 5, 6, 8, 14, 22, 23, 27, 28—9 days.

SEPTEMBER.—Sunny, 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 12, 13, 14, 16, 18, 19, 20, 21, 22, 23, 24, 25—22 days. Cloudy, 6, 15, 17, 26, 27, 28, 29—7 days.

OCTOBER.—Sunny, 1, 2, 3, 4, 5, 6, 11, 12, 13, 17, 21, 23, 24, 25, 26, 30—16 days. Cloudy, 7, 8, 9, 10, 14, 15, 16, 18, 19, 20, 22, 27, 28, 29, 31—15 days.

NOVEMBER.—Sunny, 2, 3, 4, 5, 11, 12, 24, 28—8 days. Cloudy, 1, 6, 7, 8, 9, 10, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 25, 26, 27, 29, 30—22 days.

No report for December.

THORNVILLE.

In the following statement relative to Thornville, are named for each of the months, January to December, the days of the month "sunny," "fair" and "cloudy" (the *per cent* of sunshine having been recorded for each day), the days were named sunny when the sky was three-tenths or less than three-tenths covered with clouds; fair, when the sky was four-tenths to seven-tenths (inclusive) covered; cloudy, when the sky was more than seven-tenths covered, as observed by J. S. Caulkins, M. D., Thornville.

JANUARY.—Clear, 2, 4, 8, 9, 16, 17, 19, 27, 30, 31—10 days. Fair, 1, 14, 29—3 days. Cloudy, 3, 5, 6, 7, 10, 11, 12, 13, 15, 18, 20, 21, 22, 23, 24, 25, 26, 28—18 days.

FEBRUARY.—Clear, 2, 4, 5, 10, 11, 12, 15, 16, 17, 19, 23, 24, 25, 26—14 days. Fair, 1, 3, 6, 9, 14, 18, 20—7 days. Cloudy, 7, 8, 13, 21, 22, 27, 28—7 days.

MARCH.—Clear, 2, 7, 11, 14, 16, 17, 18, 19, 20, 21, 22, 28, 30—13 days. Fair, 6, 23, 25, 27, 29—5 days. Cloudy, 1, 3, 4, 5. 8, 9, 10, 12, 13, 15, 24, 26, 31—13 days.

APRIL.—Clear, 3, 4, 8, 10, 11, 15, 17, 18, 19, 20, 21, 23, 25, 26, 27, 28, 29, 30—18 days. Fair, 2, 5, 6, 9, 13, 14, 22, 24—8 days. Cloudy, 1, 7, 12, 16—4 days.

MAY.—Clear, 1, 2, 3, 4, 5, 6, 9, 10, 12, 15, 16, 17, 21, 22, 23, 24, 28, 29, 30, 31—20 days. Fair, 7, 8, 13, 19, 20, 25, 26, 27—8 days. Cloudy, 11, 14, 18—3 days.

JUNE.—Clear, 1, 2, 3, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 21, 22, 23, 24, 25, 27, 29, 30—22 days. Fair, 5, 13, 18, 19, 26, 28—6 days. Cloudy, 4, 20—2 days.

JULY.—Clear, 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 13, 14, 16, 17, 18, 22, 25, 28, 30, 31—21 days. Fair, 8, 15, 19, 23, 24, 26, 29—7 days. Cloudy, 20, 21, 27—3 days.*

OCTOBER.—Clear, 1, 2, 3, 4, 5, 6, 9, 10, 12, 13, 14, 16, 17, 18, 21, 23, 24, 25, 26, 30—20 days. Fair, 15, 19, 27, 28—4 days. Cloudy, 7, 8, 11, 20, 22, 29, 31—7 days.

NOVEMBER.—Clear, 1, 2, 3, 4, 5, 11, 12, 18, 21, 24, 27, 28—12 days. Fair, 6, 13, 14, 15, 20—5 days. Cloudy, 7, 8, 9, 10, 16, 17, 19, 22, 23, 25, 26, 29, 30—13 days.

DECEMBER.—Clear, 3, 9, 10, 13, 14, 15, 16, 22, 25, 27, 28, 29, 31—13 days. Fair, 6, 12—2 days. Cloudy, 1, 2, 4, 5, 7, 8, 11, 17, 18, 19, 20, 21, 23, 24, 26, 30—16 days.

ALBION.

JANUARY.—Sunny, 2, 9, 16, 17, 27, 29, 30, 31—8 days. Fair, 1, 8, 15. Cloudy, 3, 4, 5, 6, 7, 10, 11, 12, 13, 14, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28-20 days.

FEBRUARY.—Sunny, 1, 2, 5, 11, 15, 16, 23, 24, 25, 26—10 days. Fair, 9, 10, 19, 22—4 days. Cloudy, 3, 4, 6, 7, 8, 12, 13, 14, 17, 18, 20, 21, 27, 28—14 days.

MARCH.—Sunny, 2, 6, 7, 11, 14, 17, 18, 19, 20, 21, 22, 28, 29, 30—14 days. Fair, 9, 16, 24, 25, 27—5 days. Cloudy, 1, 3, 4, 5, 8, 10, 12, 13, 15, 23, 26, 31—12 days.

APRIL.—Sunny, 10, 11, 15, 18, 19, 20, 23, 24, 28, 29, 30—11 days. Fair, 2, 3, 4, 5, 16, 22, 25, 27—8 days. Cloudy, 1, 6, 7, 8, 9, 12, 13, 14, 17, 21, 26—11 days.

MAY.—Sunny, 1, 2, 3, 4, 5, 9, 16, 22, 23, 24, 28, 29, 30, 31—14 days. Fair, 6, 8, 10, 12, 17, 20, 21, 25, 27—9 days. Cloudy, 7, 11, 13, 14, 15, 18, 19, 26—8 days.†

OCTOBER.—Sunny, 1, 2, 3, 4, 5, 7, 10, 12, 13, 14, 15, 16, 17, 18, 21, 23, 24, 25, 26—19 days. Cloudy, 6, 8, 9, 11, 19, 20, 22, 27, 28, 29, 30, 31—12 days.

NOVEMBER.—Sunny, 1, 2, 3, 5, 10, 11, 12, 15, 20, 24, 27, 28—12 days. Cloudy, 4, 6, 7, 8, 9, 13, 14, 16, 17, 18, 19, 21, 22, 23, 25, 26, 29, 30—18 days.

DECEMBER.—Sunny, 6, 12, 13, 14, 22, 27, 28 29, 31—9 days. Cloudy, 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 15, 16, 17, 18, 19, 20, 21, 23, 24, 25, 26, 30—22 days.

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* No report for August and September.

† No report for June, July, Aug. and Sept.

ANN ARBOR.

January.—Sunny, 4, 16, 27, 28—4 days. Fair, 1, 2, 8, 9, 14, 15, 17, 22, 29, 30, 31—11 days. Cloudy, 3, 5, 6, 7, 10, 11, 12, 13, 18, 19, 20, 21, 23, 24, 25, 26—16 days.

February.—Sunny, 2, 5, 10, 15, 16, 22, 23, 25, 26—9 days. Fair, 3, 4, 9, 11, 12, 14, 17, 24—8 days. Cloudy, 1, 6, 7, 8, 13, 18, 19, 20, 21, 27, 28—11 days.

March.—Sunny, 2, 6, 7, 17, 18, 19, 21. 22, 28, 30—10 days. Fair, 9, 10, 11, 14, 16, 20, 23, 24, 25, 27—10 days. Cloudy, 1, 3, 4, 5, 8, 12, 13, 15, 26, 29, 31—11 days.

April.—Sunny, 3, 4, 10, 11, 13, 15, 18, 19, 20, 23, 25, 28, 29, 30—14 days. Fair, 2, 5, 6, 8, 9, 12, 17, 21, 22, 24, 26, 27—12 days. Cloudy, 1, 7, 14, 16—4 days.

May.—Sunny, 1, 3, 4, 9, 16, 17, 22, 23, 24, 28, 29, 30, 31—13 days. Fair, 2, 5, 6, 7, 8, 10, 11, 12, 15, 19, 20, 21, 25, 27—14 days. Cloudy, 13, 14, 18, 26—4 days.

June.—Sunny, 1, 2, 3, 8, 9, 10, 11, 14, 15, 16, 17, 21—12 days. Fair, 6, 7, 12, 13, 18, 19, 22, 23, 24, 26, 27, 28, 29, 30—14 days. Cloudy, 4, 5, 20, 25—4 days.

July.—Sunny, 1, 2, 3, 4, 5, 6, 11, 14, 16, 20, 25, 28, 30, 31—14 days. Fair, 7, 8, 9, 10, 12. 13, 15, 17, 18, 19, 21, 23, 24, 26, 27, 29—16 days. Cloudy, 22.

August.—Sunny, 1, 4, 7, 8, 12, 13, 14, 15, 16, 17, 18, 19, 21, 25, 30—15 days. Fair, 2, 3, 9, 10, 11, 20. 22, 23, 24, 27, 28, 29, 31—13 days. Cloudy, 5, 6, 7—3 days.

September.—Sunny, 1, 3, 5, 7, 11, 18, 20, 21, 22, 24, 25, 27—12 days. Fair, 2, 4, 6, 8, 9, 10, 14, 15, 16, 17, 19, 23, 26—13 days. Cloudy, 12, 13, 28, 29, 30—5 days.

October.—Sunny, 1, 2, 3, 9, 10, 13, 17, 18, 23, 24, 25, 26—12 days. Fair, 5, 8, 14, 15, 16, 21, 22, 30—8 days. Cloudy, 4, 6, 7, 11, 12, 19, 20, 27, 28, 29, 30—11 days.

November.—Sunny, 2, 10, 11, 12, 20, 27—6 days. Fair, 1, 3, 17, 24, 28—5 days. Cloudy, 4, 5, 6, 7, 8. 9, 13, 14, 15, 16, 18, 19, 21, 22, 23, 25, 26, 29, 30—19 days.

December.—Sunny, 13, 14, 31. Fair, 2, 3, 6, 7, 9, 12, 25, 27, 28—9 days. Cloudy, 1, 4, 5, 8, 10, 11, 15. 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 29, 30—19 days.

SAULT STE. MARIE.

March.—Clear, 10, 14, 17, 18, 19, 20, 21, 28—8 days. Partly cloudy, 1, 3, 4, 5, 6, 8, 11, 15, 16, 22. 27, 30—12 days. Cloudy, 2, 7, 9, 12, 13, 23, 24, 25, 26, 29, 31—11 days.

April.—Clear, 1, 2, 4, 9, 10, 15, 17, 18, 19, 20, 25, 27—12 days. Partly cloudy, 3, 11, 23, 24, 26, 28—6 days. Cloudy, 5, 6, 7, 8, 12, 13, 14, 16, 21, 22, 29, 30—12 days.

May.—Clear, 2, 8, 9, 15, 16, 21, 23, 25, 27, 28, 29—11 days. Partly cloudy, 1, 3, 4, 5, 7, 12, 14, 20, 22, 24, 30, 31—12 days. Cloudy, 6, 10, 11, 13, 17, 18, 19, 26—8 days.

June.—Clear, 6. 8, 9, 10, 15, 16, 17, 19, 27—9 days. Partly cloudy, 1, 2, 3, 4, 7, 13, 14, 18, 20, 21, 24, 25, 29, 30—14 days. Cloudy, 5, 11, 12, 22, 23, 26, 28—7 days.

July.—Clear. 1, 2, 3, 4. 5, 10, 13, 17, 20, 22, 23, 25. 27, 28—14 days. Partly cloudy, 6, 7. 9, 12, 14, 15, 16, 21, 24, 29, 30, 31—12 days. Cloudy, 8, 11, 18, 19, 26—5 days.

August.—Clear, 1, 12, 13, 15, 16, 19, 21, 24, 29—9 days. Partly cloudy, 4, 8, 11, 18, 20, 25, 26, 28, 31—9 days. Cloudy, 2, 3, 5, 6, 7, 9, 10, 14, 17, 22, 23, 27, 30—13 days.

September.—Clear, 7, 14, 16, 20, 21—5 days. Partly cloudy, 1, 2, 3, 4, 5, 6, 9, 12, 17, 22, 23, 24, 26, 30—14 days. Cloudy, 8, 10, 11, 13, 15, 18, 19, 25, 27, 28, 29—11 days.

October.—Clear, 2, 3, 4, 25—4 days. Partly cloudy, 1, 5, 13, 18, 19, 24, 26, 29, 30—9 days. Cloudy, 6, 7, 8, 9, 10, 11, 12, 14, 15, 16, 17, 20, 21, 22, 23, 27, 28, 31—18 days.

November.—Clear, 5, 11, 16, 20—4 days. Partly cloudy, 3, 4, 6, 10, 12, 18, 19, 23, 29—9 days. Cloudy, 1, 2, 7, 8, 9, 13, 14, 15, 17, 21, 22, 24, 25, 26, 27, 28, 30—17 days.

December.—Clear, 2, 12, 29. Partly cloudy, 7, 11, 18, 23, 26, 27—6 days. Cloudy, 1, 3, 4, 5, 6, 8, 9, 10, 13, 14, 15, 16, 17, 19, 20, 21, 22, 24, 25, 28, 30, 31—22 days.

PORT HURON.

January.—Clear, 2, 4, 16, 17, 23, 24, 27—7 days. Partly cloudy, 1, 9. 15, 28, 30—5 days. Cloudy, 3, 5, 6, 7, 8, 10, 11, 12, 13, 14, 18, 19, 20, 21, 22, 25, 26, 29, 31—19 days.

February.—Clear, 2, 3, 4, 5, 10, 11, 14, 15, 16, 23, 26—11 days. Partly cloudy, 17, 19, 20, 22, 24—5 days. Cloudy, 1, 6, 7, 8, 9, 12, 13, 18, 21, 25, 27, 28—12 days.

March.—Clear, 2, 7, 11, 14, 16, 17, 18, 19, 20, 21, 22—11 days. Partly cloudy, 6, 9, 10, 12, 23, 24, 27—7 days. Cloudy, 1, 3, 4, 5, 8, 13, 15, 25, 26, 28, 29, 30, 31—13 days.

April.—Clear, 2, 4, 10, 19, 20, 25, 28, 29, 30—9 days. Partly cloudy, 3, 8, 9, 11, 16, 18, 23, 24, 27—9 days. Cloudy, 1, 5, 6, 7, 12, 13, 14, 15, 17, 21, 22, 26—12 days.

May.—Clear, 1, 2, 5, 9, 16, 21. 22. 23, 24, 28, 29, 30, 31—13 days. Partly cloudy, 3, 4, 8, 10, 17, 20, 25, 27—8 days. Cloudy, 6, 7, 11, 12, 13, 14, 15, 18, 19, 26—10 days.

June.—Clear, 1, 2, 3, 7, 8, 9, 10, 14, 15, 16, 17, 21, 24, 25—14 days. Partly cloudy, 6, 11, 12, 13, 18, 19, 20, 22, 23, 27. 28, 30—12 days. Cloudy, 4, 5, 26, 29—4 days.

July.—Clear, 2, 4, 5, 6, 7, 11, 14, 18, 25, 28, 31—11 days. Partly cloudy, 1, 3, 8, 10, 12, 13, 16, 19, 20, 21, 24, 26, 27, 29, 30—15 days. Cloudy, 9, 17, 22, 23—4 days.

August.—Clear, 1, 4, 7, 10, 12, 13, 14, 15, 16, 19, 21, 25, 30—13 days. Partly cloudy, 2, 3, 5, 8, 9, 17, 18, 20, 22, 26, 27, 29, 31—13 days. Cloudy, 6, 11, 23, 24, 28—5 days.

September.—Clear, 1, 2, 3, 10, 14, 18, 20, 21, 22, 24—10 days. Partly cloudy, 5, 6, 7, 8, 11, 16, 17, 19, 23, 25, 26, 27, 30—13 days. Cloudy, 4, 9, 12, 13, 15, 28, 29—7 days.

October.—Clear, 1, 2, 3, 4, 9, 10, 13, 17, 18, 19, 21, 24—12 days. Partly Cloudy, 5, 6, 7, 8, 12, 14, 15, 20, 22, 23, 25, 26, 27, 28, 29, 30—16 days. Cloudy, 11, 16, 31—3 days.

November.—Clear, 2, 3, 5, 11, 12, 27, 28—7 days. Partly Cloudy, 1, 4, 6, 10, 13, 15, 16, 17, 18, 20, 21, 22, 24—13 days. Cloudy, 7, 8, 9, 14, 19, 23, 25, 26, 29, 30—10 days.

December.—Clear, 5, 14, 16, 29—4 days. Partly cloudy, 3, 4, 6, 9, 10, 13, 15, 22, 25, 27, 28—11 days. Cloudy, 1, 2, 7, 8, 11, 12, 17, 18, 19, 20, 21, 23, 24, 26, 30 31—16 days.

LANSING.

January.—Sunny, 2, 8, 9, 16, 17, 27, 31—7 days. Partly cloudy, 1, 4, 15, 30—4 days. Cloudy, 3, 5, 6, 7, 10, 11, 12, 13, 14, 18, 19, 20, 21, 22, 23, 24, 25, 26, 28, 29—20 days.

February.—Sunny, 2, 4, 5, 15, 16, 25, 26—7 days. Partly cloudy, 7, 9, 19, 22, 24—5 days. Cloudy, 1, 3, 6, 8, 10, 11, 12, 13, 14, 17, 18, 20, 21, 23, 27, 28—16 days.

March.—Sunny, 2, 6, 7, 11, 17, 18, 19, 20, 21, 22, 28, 30—12 days. Partly cloudy, 10, 16, 23, 29—4 days. Cloudy, 1, 3, 4, 5, 8, 9, 12, 13, 14, 15, 24, 25, 26, 27, 31—15 days.

April.—Sunny, 4, 10, 18, 19, 20, 23, 25, 27, 28, 30—10 days. Partly cloudy, 3, 9, 15, 24, 29—5 days. Cloudy, 1, 2, 5, 6, 7, 8, 11, 12, 13, 14, 16, 17, 21, 22, 26—15 days.

May.—Sunny, 1, 2, 9, 10, 22, 23, 24. 28, 29, 30, 31—11 days. Partly cloudy. 3, 5, 8—3 days. Cloudy, 4, 6, 7, 11, 12, 13, 14, 15. 16, 17, 18, 19, 20, 21, 25, 26, 27—17 days.

June.—Sunny, 1, 3, 6, 7, 8, 9, 10, 11, 15, 16, 17, 19, 21, 22—14 days. Partly cloudy, 2, 13, 24, 25, 27—5 days. Cloudy, 4, 5, 12, 14, 18, 20, 23, 26, 28, 29, 30—11 days.

July.—Sunny, 2, 3, 4, 5, 6, 7, 9, 13, 14, 16, 23, 28—12 days. Partly cloudy, 1, 10, 11, 17, 18, 20, 21, 22, 25, 26, 27, 30, 31—13 days. Cloudy, 8, 12, 15, 19, 24, 29—6 days.

August.—Sunny, 1, 2, 9, 12. 13, 14, 15, 16, 21, 30, 31—11 days. Partly cloudy, 3, 4, 5, 7, 8, 10, 11, 17, 18, 19, 25, 26—12 days. Cloudy, 6, 20, 22, 23, 24, 27, 28, 29—8 days.

September.—Sunny, 2, 3, 5, 7, 8, 10, 11, 14, 18, 19, 20, 21, 22, 23, 24, 25, 26—17 days. Partly cloudy, 1, 6, 9, 12, 17, 27, 28—7 days. Cloudy, 4, 13, 15, 16, 29, 30—6 days.

October.—Sunny, 2, 3, 5, 10, 13, 17, 18, 21, 23, 24, 25, 26—12 days. Partly cloudy, 1, 4, 7, 12, 14, 15, 16—7 days. Cloudy, 6, 8, 9, 11, 19, 20, 22, 27, 28, 29, 30, 31—12 days.

November.—Sunny, 2, 3, 5, 10, 11, 12, 20, 24, 27, 28—10 days. Cloudy, 1, 4, 6, 7, 8, 9, 13, 14, 15, 16, 17, 18, 19, 21, 22, 23, 25, 26, 29, 30—20 days.

December —Sunny, 6, 12, 13—3 days. Cloudy, 1, 2, 3, 4, 5, 7, 8, 9, 10, 11, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31—28 days.

THE TIME OF GREATEST PREVALENCE OF EACH DISEASE.

CONTRIBUTIONS TO THE STUDY OF THE CAUSES OF SICKNESS.

A STATISTICAL REPORT BASED ON WEEKLY REPORTS OF SICKNESS IN MICHIGAN DURING THE YEAR 1895, AND PRECEDING YEARS.

BY THE SECRETARY OF THE STATE BOARD OF HEALTH.

This paper is the nineteenth in a series of articles upon the same general subject begun in the latter part of 1876. It presents a summary of the compilation of weekly reports of sickness in Michigan in 1895. It includes a series of diagrams or graphic illustrations which show by months in 1895, the rise and fall of twenty-eight of the most prominent diseases in Michigan.

Propositions are stated as to the relations of specified meteorological conditions, and diseases are mentioned under these propositions in such manner as to suggest one method of studying some of the facts brought out in the compilation.

Tables are given showing the per cent of the weekly *reports* which stated the presence of the various diseases, first (in Exhibit IV.), for each of the years, 1883-1885, and an average for 1877-1894, also for the nine years, 1886-1894, and secondly (in Exhibit IV., continued), by months, in each of the years 1894, 1895, and the average for the period of eighteen years, 1877-1894, also for the period of nine years, 1886-1894, the diseases being arranged in the order of their greatest reported prevalence in 1895, to facilitate a comparison with the prevalence of the same diseases in previous years, and in corresponding months in previous years.

The per cent of *observers* stating the presence of each of the diseases is given in Table 1, for the year 1895, and, for comparison, for each of the years 1883-1894, and, in Table 1, continued, for the months in the year 1895, and, for comparison, by months in the year 1894, and the average by months for the period 1877-1894, also for the period of nine years, 1886-1894.

Comparing Table 1, with Exhibit IV., we see the correspondence in the two lines of evidence,—that of the "prevalence" of the diseases as shown by the per cent of *reports*, and the "area of prevalence" as shown by the per cent of *observers*, the diseases following each other in a somewhat similar order from highest to lowest—the diseases being arranged in the table, as in the exhibit, in the order of their greatest reported prevalence in 1895.

One of the objects of this compilation is to learn the time of the greatest and of the least prevalence of each of the more important diseases in the State, and to note the connection of this prevalence with each of the meteorological conditions in the State. Casual observation shows that certain diseases are much more prevalent in the hot months, while certain other diseases are much more prevalent in the cold months. The relation between these diseases and the atmospheric temperature is well marked, but accurate statistics are needed to show just what that relation is. We find, also, that other meteorological conditions than atmospheric temperature have a marked effect upon many of the diseases, apparently diminishing the effect of temperature in some instances, increasing its effect in other instances. For these reasons the State Board of Health undertakes, by a compilation of the weekly reports of sickness in connection with the various meteorological conditions, to learn what causal relations exist between the humidity of the air, the ozone, the velocity of the wind, the atmospheric pressure, etc., and the increased or diminished prevalence of each disease in certain months as compared with other months in the same year, or with the same months in other years or series of years.

Since 1876, when this system of "weekly reports of sickness" was begun, an important work has been accomplished in learning the time of the greatest prevalence of each of several of the most important diseases, and consequently the time of greatest danger from each such disease, in the State considered as a unit. To facilitate the study of the causes of sickness and deaths, the State is divided into eleven geographical divisions, a list of which, and the counties embraced in each, appear in Exhibit I. From some of these divisions sufficient data are not yet received to make the study of the comparative prevalence of diseases in different parts of the State practicable. The number of reports from localities in the newer parts of the State is increasing, however, and a comparison of sickness by localities may soon become practicable.

PHYSICIANS' WEEKLY REPORTS OF SICKNESS.

Weekly reports are now received concerning twenty-eight diseases, the names of which are printed on the blank postal used for the weekly report; and concerning these twenty-eight diseases a positive report is made each week by each of many of the leading physicians in Michigan.

Great credit is due the busy medical practitioners in Michigan who forward these reports of sickness. Some of them have made the reports regularly since this plan was adopted in 1876. The service is, as a rule, without compensation; a few health officers have slight pay from their local boards of health. Each one should have full compensation. No other class of persons has knowledge of the facts that are necessary in the compilation of health statistics; and it is greatly to the credit of physicians that they are so willing to coöperate in every effort made to advance the public health.

PLAN OF THE WEEKLY CARD-REPORTS.

The plan of the weekly reports remains the same as last year. (Cards having *Pleuritis* printed on them were first used for weekly reports in October, 1887.) Observers now report only the diseases under their own personal observation. Previous to the year 1885, some of the observers reported such diseases as they believed to be present in their locality, even though not under their own observation. The change in method of making the reports may account partially for the apparent decrease in sickness in 1895, when compared with the average for the eighteen years, 1877–94. Details of the method of securing and the plan of marking these reports may be thus stated:—

The blanks for the weekly reports are printed on postal cards, which are supplied to the observers of diseases. Blank record books in which to preserve copies of the reports, remarks, etc., are also supplied to these observers, to be retained by them. The reports are forwarded weekly to the Secretary of the State Board of Health at Lansing.

The plan of making the report is as follows: Each observer is requested to mark the disease of which there was the greatest number of cases under his observation during the week for which the report is made, 1; that of which there was the next greatest number of cases, 2; the next, 3; and so on, applying *consecutive* numbers to the diseases reported present; but marking with the *same* figure all diseases of which there is the same number of cases; to write 0 opposite each disease mentioned of which there was no case; to apply these numbers without regard to the severity of the cases; to include all cases, without regard to when they were taken sick, so long as they are actually sick with the given disease; to include all cases "under the observation" of the observer. A blank is left on the card for the convenience of those observers who prefer to state the number of cases rather than the order of prevalence by the foregoing method.

To illustrate the method of making the reports, the following copy of one of the blanks now in use is given, correctly marked, in the "prevalence" column, for the number of cases stated on the right-hand margin. It should be remembered that the numbers in the "prevalence" column denote simply the relative order in which the several diseases appear to be prevalent, and do not denote a definite number of cases; so that a disease might one week be marked *4*, and the following week, with the same number of cases, be marked *1*. Names of diseases and figures printed in italics are not *printed* on the postal blanks, but are supposed to have been *written* on the report by the observer.

*Diseases in*________________________________and vicinity.
☞PLEASE DATE. ☜
week ending Sat.,________________________________, *189*____

REMARKS:—

Ed. 39.

a. Please mark the disease of which there is the greatest number of cases, 1; the disease having next greatest number of cases, 2; the next, 3; and so on for each disease, writing the same figures opposite diseases having the same number of cases. Write 0 opposite each disease of which there is no case under your observation. [For full statement of plan, see second, third, and fourth pages of record-book cover.] A blank indicates that the item has been overlooked.

If this report includes a contagious disease, please mention, on the bottom or margin of this card, the township, city, or village in which the disease is.

Please mail this, ☞ signed and dated, ☜ as soon as convenient after close of week specified.

DISEASES, CASES OBSERVED.

	Preval'nce Order. See a	No. of Cases.
Brain, Inflammation of	*14*	*1*
Bowels, Inflammation of	*12*	*3*
Bronchitis	*11*	*4*
Cerebro-spinal Meningitis	*0*	*0*
Cholera Infantum	*8*	*9*
Cholera Morbus	*10*	*6*
Consumption, Pulmonary	*10*	*6*
Croup, Membranous	*12*	*3*
Diphtheria	*5*	*14*
Diarrhea	*3*	*17*
Dysentery	*8*	*9*
Erysipelas	*13*	*2*
Fever, Intermittent	*2*	*21*
Fever, Remittent	*11*	*4*
Fever, Typhoid (Enteric)	*0*	*0*
Fever, Typho-malarial	*9*	*7*
Influenza	*7*	*11*
Kidney, Inflammation of	*14*	*1*
Measles	*1*	*27*
Neuralgia	*14*	*1*
Pleuritis	*0*	*0*
Pneumonia	*9*	*7*
Puerperal Fever	*0*	*0*
Rheumatism	*6*	*12*
Scarlatina	*4*	*16*
Small-pox	*0*	*0*
Tonsillitis	*11*	*4*
Whooping-cough	*0*	*0*
Mumps	*6*	*12*
Dyspepsia	*11*	*4*

________________________________ *M. D.*

BULLETINS OF HEALTH IN MICHIGAN.

During the year 1895 the issue of weekly and monthly bulletins of "Health in Michigan" has been continued. The weekly bulletin is compiled from the physicians' weekly reports from all parts of the State. It is designed to give, each week, information to the members of the State Board of Health and to the public concerning the diseases which cause most sickness in the State, the relative amount of sickness compared with the preceding week—thus showing any sudden increase or decrease which may have occurred in the prevalence of any disease, together with a similar comparison of the various meteorological conditions; also, a list of the localities in which each of the dangerous communicable diseases is reported present. This system enables the Secretary of the State Board of Health to "have his finger on the public pulse,"—to constantly be informed of the conditions of health throughout the State. If the newspapers would publish the localities where dangerous communicable diseases are, the information would be valuable to parents who might thus be enabled to avoid taking their children to such places until after the disease had ceased and thorough disinfection had occurred. A copy of this bulletin has been sent to such editors as have expressed a desire to have it for use, entire or in part, in their papers. About fifty copies are now used for this purpose each week. An abstract of it was sent to the Michigan Associated Press, until October 3, 1894. The monthly bulletin is similar in character to the weekly bulletin; it shows the relative amount of sickness compared with the average for corresponding months in previous years, and compared with the preceding month, together with a similar comparison of the various meteorological conditions. It is issued as soon as possible after the close of each month, and is sent to the sanitary and medical journals which are received as exchanges by the library of the State Board of Health. About one hundred and ten copies are thus used at the present time.

As a rule, about five-eighths of the card reports reach the Office of the State Board of Health in time for compilation in the weekly bulletin, and the monthly bulletins are compiled from the information used in the weekly bulletins. It is found that the statements made in the monthly bulletins are corroborated by the information, after the close of the year, from the compilation of the whole number of the reports for the corresponding months of the year.

ANNUAL COMPILATION OF THE WEEKLY REPORTS.

The reports from each locality are compiled by months. The average of the numbers stating the order of prevalence of the several diseases for the month is considered an indication of the actual order of prevalence of the diseases for that time. There is also found for each locality what per cent of the reports state the presence of each disease for the given month. This per cent of reports for a single locality indicates what part of the month the disease was present in that locality. It may also be called the per cent of weeks the disease was present. These first results of the compilation are stated in Table 3, which, on account of the space required, has not been printed in the reports since that of 1882, but is preserved in the office of the State Board for reference and study.

A combination of the statements for localities in Table 3, is made by months for the State, so far as it is represented by the localities from which reports are received, showing: (1) What per cent of the observers reported each disease each month; (2) for the localities at which a given disease was reported, an average of the per cent of weeks it was reported at those localities; (3) what per cent of all the reports received for the month stated the presence of each disease; (4) an average of the numbers denoting the order of prevalence of each disease at the localities at which it was reported present during the month.

THE PREVALENCE OF THE SEVERAL DISEASES IN 1895.

By noting the per cent of all the reports received for a given time which stated the presence of each disease, the relative prevalence of the several diseases may be readily seen. This per cent has been computed for each disease, by months for the year 1895. It is thus stated in Exhibit II., page 86, which also states the per cent for each disease for the year 1895, and an average for the period of eighteen years, 1877–94, also for the period of nine years, 1886–94. What per cent of the reports stated the presence of each disease by months in 1895, is graphically represented in Diagrams 1–5 on page 87 and following pages.

For twenty diseases a comparison has been made of the amount of sickness in 1895 (as indicated by the proportion of reports stating the presence of the disease) with the average amount for a period of eighteen years, also for a recent period of nine years. These comparisons are shown in Exhibits XI., XIII., XVIII., and XX. A comparison is made in Table 1, on pages 95, 96 and 97, between the per cents of observers reporting the tabulated diseases present in each of the years 1883–1895, and by months in two of those years; also an average by months for the period of eighteen years, 1877–94, also for the period of nine years, 1886–1894. In Exhibit IV., on pages 89, 90 and 91, the per cents of reports stating the presence of each of the twenty-eight tabulated diseases, for each of the years 1883–95, and an average by months for the years 1894 and 1895, and for the period of eighteen years, 1877–94, also for the period of nine years, 1886–1894, is given. In Table 1, and in Exhibit IV., the diseases are arranged in the order of the greatest per cents for 1895, the highest being placed first.

A study of the reported sickness from twenty-one diseases, in connection with meteorological conditions by months in 1895, is made in Exhibit X., and following exhibits. By arranging months in order of greatest prevalence of the disease under consideration, noting whether it is more or less prevalent than the average for the year, and noting what were the meteorological conditions for the same months as compared with the average for the year, relations and comparisons are grouped for convenient comparison. A summary of one line of the evidence presented by these exhibits is given in Exhibits XXV. and XXVI.

In Exhibits VI. and VII., on subsequent pages, the leading diseases are arranged in order according to the amount of sickness reported from them in 1895, those from which there was most sickness reported being placed first. In these exhibits the diseases are arranged with reference to the per cent of reports taken in connection with the average order of prevalence.

The comparison with former years is facilitated by reference to Exhibit II., Table 1, Exhibit IV., and Exhibits XI., XIII., XVIII., and XX.

Exhibit IV., is continued for 1895. In it the diseases are arranged in order of the greatest per cent of reports stating the presence of the diseases in 1895, the highest per cent being placed first in the line. It is similar in form to Table 1, page 95, which shows the per cent of observers by whom diseases were reported present. It affords a means of comparing the diseases showing greatest prevalence with those showing greatest area of prevalence or widest distribution. It affords also a means for the comparison of per cent of reports in 1895, with the average per cent of reports in the eighteen years, 1877–1894, also in the nine years, 1886-1894, both for the year and by months, also by months in 1895 with the year 1894.

DISEASES FROM WHICH THERE WAS A MARKED INCREASE OR DECREASE IN PREVALENCE IN MICHIGAN IN 1894.

By referring to Exhibits II. and IV., it will be seen that influenza and typhoid fever showed a slight increase in 1895 over the average for the eighteen years, 1877-1894; the diseases in which the decrease in 1895 appears most marked are intermittent fever, remittent fever, pneumonia, measles, typho-malarial fever, diphtheria, membranous croup and whooping-cough.

A part of the lessened prevalence of some of the prominent diseases may be due to the change in the method of reporting sickness, referred to in the last paragraph on page 80.

A comparison of 1895 with the average for the nine years, 1886-1894, shows that cholera morbus, scarlet fever, and whooping-cough were the only diseases in which there was a marked increase in 1895; and that intermittent fever, erysipelas, remittent fever, diphtheria, typho-malarial fever, measles, whooping-cough and consumption are the only diseases in which there was a marked decrease in 1895.

Method of Comparison of Diseases by Years, Months, and Weeks.

In the Annual Reports ending with that for 1888, mention was made of diseases in which a difference of seven or more was shown between the per cents of reports stating the presence of the disease in the current year and in the preceding year or term of years; in the Reports since that for 1888 those diseases were mentioned of which the comparison showed an increase or decrease of twenty-five per cent from the preceding year, or from the normal, as the case may be.

In this report, those diseases which are reported by seven or more observers, and which show an increase or decrease of twenty-five per cent are generally mentioned, except in cases of cholera, small-pox, typhus fever or other particularly interesting or dangerous disease, and these are specially considered in each instance.

This rule was adopted also for the weekly and monthly bulletins, "Health in Michigan," beginning with February, 1893.

In Exhibits XI., XIII., XVIII., and XX., the per cent of reports by months in 1895 is placed directly under the per cents for the corresponding months in 1894. A comparison between the corresponding months in the two years is thus made possible, and the comparison of the months in 1895 with the averages for the months in the series of years preceding is made possible by placing the differences, greater or less, in separate lines.

EXHIBIT I.—*Eleven Geograghical Divisions of the State, formed for the purpose of facilitating the study of Causes of Sickness and of Deaths, with a list of Counties included in each Division.*

1 —Upper Peninsular.	2.—Northwestern.	3.—Northern.	4.—Northeastern.	5.—Western.	6.—Northern Central.	7.—Bay and Eastern.	8.—Central.	9.—Southwestern.	10.—Southern Central.	11 —Southeastern.
Alger.	Benzie.	Antrim.	Alcona.	Kent.	Clare.	Arenac.	Barry.	Allegan.	Branch.	Macomb.
Baraga.	Gr. Traverse.	Charlevoix.	Alpena.	Lake.	Gladwin	Bay.	Clinton.	Berrien.	Calhoun.	Monroe.
Chippewa.	Leelanau.	Cheboygan.	Iosco.	Mason.	Isabella.	Huron.	Eaton.	Cass.	Hillsdale.	Oakland.
Delta.	Manistee.	Crawford.	Montmorency.	Muskegon.	Mecosta.	Lapeer.	Genesee.	Van Buren.	Jackson.	Wayne.
Dickinson.	Manitou.	Emmet.	Ogemaw.	Newago.	Midland.	Saginaw.	Gratiot.		Kalamazoo.	
Gogebic.	Wexford.	Kalkaska.	Oscoda.	Oceana.	Roscommon.	Sanilac.	Ingham.		Lenawee.	
Houghton.		Otsego.	Presque Isle.	Ottawa.	Missaukee.	St. Clair.	Ionia.		St. Joseph.	
Iron.					Osceola.	Tuscola.	Livingston.		Washtenaw.	
Keweenaw.							Montcalm.			
Luce.							Shiawassee.			
Mackinac.										
Marquette.										
Menominee.										
Ontonagon.										
Schoolcraft.										

On pages 230 and 253 of the Report of this Board for 1885, the divisions and the counties in each were indicated by lines on maps of the State.

EXHIBIT II.—*Stating for each of 28 Diseases for the Year ending Saturday, December 28, 1895, by Months of the Year 1895, the average for the period for eighteen years, 1877–94, and the average for the period of nine years, 1886–94, on what Per Cent of the reports received each Disease was stated to be present.—Compiled from weekly reports by the Health Officers of Cities and Villages, by Regular Correspondents of the State Board of Health, and by other physicians.**

Diseases.	What Per Cent of the Reports received stated the Presence of the Disease.														
				Months, 1895.											
	Av. 1877–1894.	Av. 1886–1894.	Av. Year 1895.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average Disease †	27	23	20	20	21	22	22	19	18	19	20	19	19	17	18
Brain, inflammation of	5	4	3	2	4	3	3	3	3	3	5	3	4	2	2
Bowels, inflammation of	14	14	11	6	10	9	13	10	11	10	16	16	13	10	8
Bronchitis	59	57	52	66	71	70	66	56	47	34	34	35	44	52	52
Cerebro-spi. meningitis	4	3	0.8	1	1	2	2	1	0	1	1	1	0.5	1	0.3
Cholera infantum	13	12	12	2	1	1	2	5	13	27	37	40	13	1	0
Cholera morbus	17	15	15	5	6	3	4	7	17	3	37	38	14	4	4
Consumption, pul	56	46	29	33	31	33	34	29	30	29	28	25	25	24	24
Croup, membranous	5	3	2	2	3	2	5	1	1	1	1	1	0.7	1	2
Diphtheria	15	8	5	10	6	5	4	1	4	4	5	4	6	6	5
Diarrhea	45	44	42	23	28	29	33	30	44	64	73	71	50	21	24
Dysentery	18	16	15	5	7	4	5	5	9	27	42	38	25	6	2
Erysipelas	22	20	13	8	11	11	19	17	19	13	12	7	10	12	21
Fever, intermittent	56	38	22	17	13	16	19	22	27	30	27	26	23	20	19
Fever, remittent	38	27	20	17	15	15	13	18	23	25	20	24	28	21	22
Fever, typhoid (enteric)	11	10	13	8	5	5	8	3	3	13	19	23	31	24	14
Fever, typho-malarial	16	10	4	2	3	2	3	1	0.3	5	5	5	10	4	1
Influenza	41	41	44	67	74	84	80	50	27	19	17	14	26	41	50
Kidney, inflammation of	20	19	20	17	25	24	24	24	20	17	17	16	18	21	21
Measles	11	9	4	3	4	5	6	7	8	4	2	2	0.2	2	3
Neuralgia	64	63	56	58	63	69	65	63	57	51	49	45	53	52	56
Pleuritis	-----	‡17	17	25	22	27	19	16	14	13	9	9	11	17	19
Pneumonia	32	26	21	39	42	45	35	19	8	8	5	4	9	18	22
Puerperal fever	5	4	2	4	4	2	3	2	3	1	1	1	2	3	2
Rheumatism	68	67	60	60	64	69	69	66	58	53	53	53	60	61	60
Scarlatina	14	10	12	18	10	14	16	13	11	5	6	8	13	16	13
Small-pox	0.7	0.2	0.3	1	1	1	0	0	0	0	0	0.3	0.5	0	0
Tonsillitis	48	47	43	54	54	55	55	45	38	32	31	26	36	45	53
Whooping-cough	16	12	9	15	11	9	9	8	9	12	9	9	4	5	8
Total No. reports rec'd	§382	§430	§366	452	367	341	267	341	341	452	366	378	432	335	322

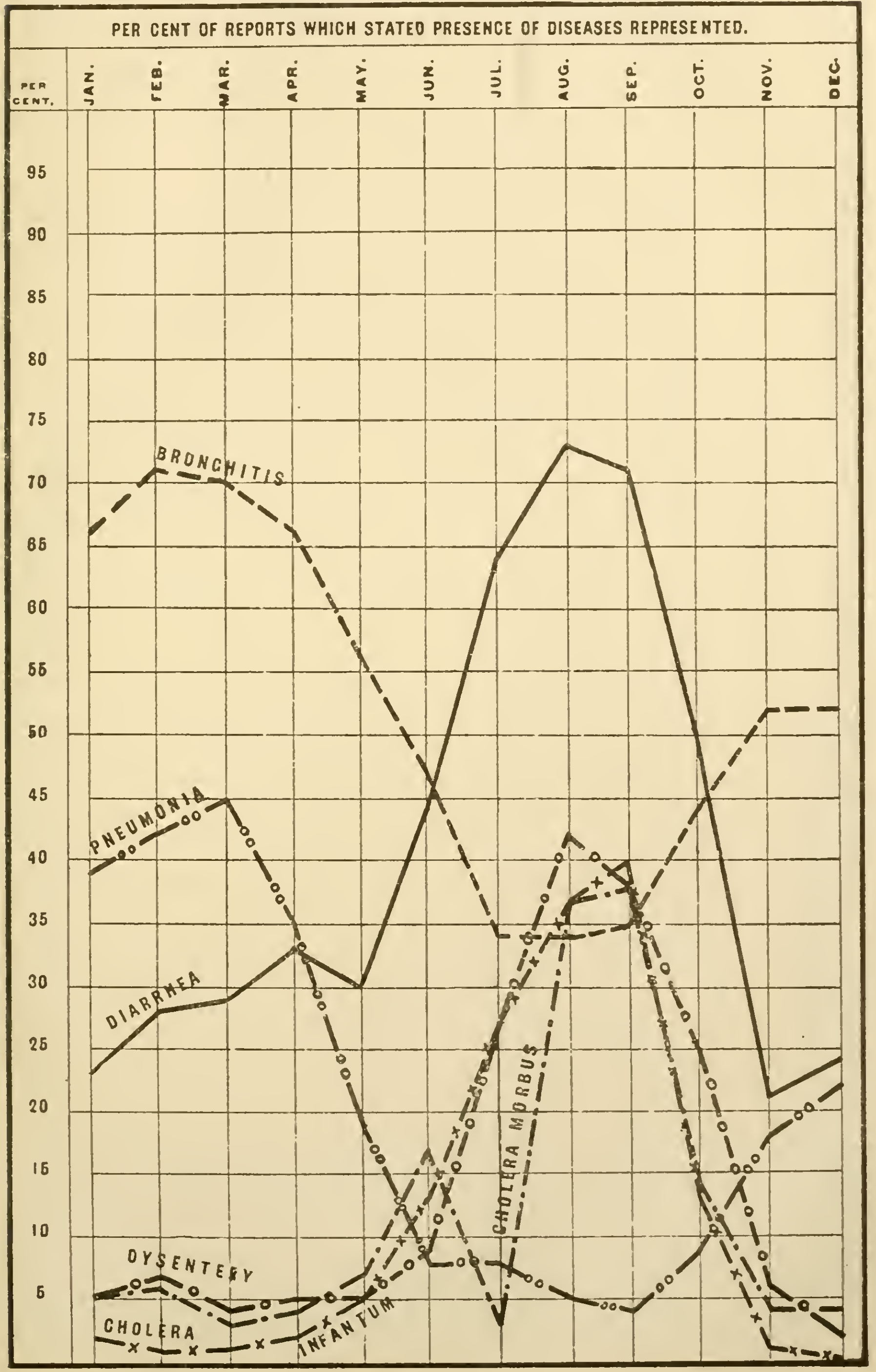
* For 1895 the names of observers are stated in Exhibit V.

† This line is an average for such of the tabulated diseases as were reported present in the given month or year. § Averages per month. ‡ An average for the period 1888–1894.

Statements in this exhibit for months in 1895 are graphically represented in Diagrams 1, 2, 3, 4, 5, opposite this page, and on following pages.

DIAGRAM I—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1895.

PER CENT OF REPORTS WHICH STATED PRESENCE OF DISEASES REPRESENTED.



[PLATE 869]

EXHIBIT III.—*Stating, by Months of the Year ending Saturday, December 28, 1895, for the State, and for each of the Eleven Geographical Divisions of Michigan from which Weekly Reports of Diseases were received, the number of Observers from whom the Reports were received; the number of reports received; the day on which, for the purposes of this compilation, each month is made to end; and the number of Weeks thus included in each Month.*

Months, 1895.	Months and Year end Saturday.	Number of Weeks.	State.		Divisions of the State.*																					
					1. Up. Peninsular.*		2. Northwestern.*		3. Northern.*		4. Northeastern.*		5. Western.*		6. Northern-Central.*		7. Bay and Eastern.*		8. Central.*		9. Southwestern.*		10. Southern-Central.*		11. Southeastern.*	
			Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports.†	Observers.‡	Reports †
Year, 1895 †	Dec. 28, 1895	52	185	4,394	54	194	33	123	57	219	20	84	84	325	49	190	156	601	235	937	95	362	224	869	119	490
Av. per month			94	366	5	16	3	10	5	18	2	7	7	27	4	16	13	50	20	78	8	30	19	72	10	41
January	February 2	5	97	452	7	35	3	14	4	18	2	10	11	47	1	5	15	69	17	81	8	38	20	92	9	43
February	March 2	4	99	367	8	28	3	10	4	15	2	8	10	39	1	4	15	58	17	65	7	25	20	73	12	42
March	March 30	4	95	341	8	30	2	8	3	12	2	8	10	37	2	6	15	48	14	52	8	28	20	72	11	40
April	April 27	4	80	267	8	25	4	10	6	19	1	4	5	18	2	5	10	34	13	47	6	19	17	55	8	31
May	June 1	5	75	341	4	16	2	10	6	29	1	5	5	22	3	12	9	42	13	60	7	33	14	63	11	49
June	June 29	4	101	341	4	10	2	7	7	22	2	6	5	15	6	21	13	43	22	78	10	31	20	68	10	40
July	August 3	5	97	452	4	17	3	14	4	19	2	10	6	28	7	30	13	63	21	100	7	31	19	87	11	53
August	August 31	4	101	366	4	14	2	8	6	18	2	8	5	18	7	26	14	47	23	82	9	31	19	75	10	39
September	September 28	4	105	378	3	8	3	10	4	16	2	8	8	29	6	24	13	45	26	93	9	31	20	72	11	42
October	November 2	5	95	432	1	4	3	13	4	17	2	9	7	30	5	22	15	66	22	105	9	39	17	79	10	48
November	November 30	4	94	335	1	3	3	9	4	15	1	4	6	19	5	19	13	44	25	93	7	27	21	71	8	31
December	December 28	4	87	322	2	4	3	10	5	19	1	4	6	23	4	16	11	42	22	81	8	29	17	62	8	32

* The counties in each division are given in Exhibit I. † From some of the observers reports were not received every week, so that the number of reports received does not equal the number of observers multiplied by the number of weeks in the given month or in the year.

‡ In some localities there were more observers than one. The whole number of localities from which reports were received was 153; the average number per month was 91. The names of observers and number of cards received from each observer for each month and for the year are stated in Exhibit V.

EXHIBIT IV.—*Stating for each of 28 Diseases, the average for the period of eighteen years, 1877–1894, and for each of the last twelve of those years and 1895, and for the period of nine years, 1886–1894, on what Per Cent of the Reports received the Diseases were stated to be present. Compiled from Weekly Reports by Health Officers of Cities and Villages and by regular correspondents of the State Board of Health.* Continued for each month of 1894 and 1895 on pages following this.*

Line Number	Diseases.	What Per Cent of the Reports stated the Presence of the Disease.														
		Av. 1877–94.	Av. 1886–94	1895.	1894.	1893.	1892.	1891	1890.	1889.	1888.	1887.	1886	1885	1884	1883.
	Average Disease †	27	23	20	20	20	21	25	25	23	24	25	26	26	29	30
1	Rheumatism	68	67	60	62	64	64	69	71	65	66	69	70	68	70	68
2	Neuralgia ‡	64	63	56	56	57	61	66	67	63	62	67	67	68	70	69
3	Bronchitis	59	57	52	50	53	54	60	65	58	59	55	56	56	61	66
4	Influenza	41	41	44	41	43	42	55	53	32	32	33	35	34	41	43
5	Tonsillitis ‡	48	47	43	42	49	48	49	50	46	41	47	49	50	50	50
6	Diarrhea	45	44	42	40	40	43	47	44	45	41	48	45	46	52	49
7	Consumption, pul. ‡	56	46	29	36	38	38	49	52	48	49	51	55	58	63	61
8	Intermittent fever	56	38	22	24	24	27	36	41	43	45	48	54	59	65	69
9	Pneumonia	32	26	21	20	22	25	27	30	26	30	28	27	27	29	38
10	Remittent fever	38	27	20	20	18	21	28	27	30	34	32	34	36	44	41
11	Inflam. of kidney ‡	20	19	20	17	17	21	20	21	20	19	18	20	21	26	------
12	Pleuritis ‡	------	17	17	13	14	18	21	19	17	18	------	------	------	------	------
13	Dysentery	18	16	15	14	13	15	16	16	17	17	19	17	15	23	21
14	Cholera morbus	17	15	15	14	14	15	16	15	14	15	19	17	17	22	18
15	Typhoid fever (ent.)	11	10	13	11	9	9	11	8	10	10	10	8	8	12	11
16	Erysipelas	22	20	13	13	14	16	19	21	22	24	24	23	24	26	25
17	Cholera infantum	13	12	12	12	10	11	13	10	11	11	13	14	17	15	14
18	Scarlet fever	14	10	12	14	10	12	9	10	10	9	8	11	12	16	19
19	Inflam. of bowels ‡	14	14	11	13	12	13	15	14	14	14	16	17	17	17	16
20	Whooping-cough	16	12	9	12	9	10	9	9	16	9	14	20	14	23	15
21	Diphtheria	15	8	5	7	7	7	6	8	6	7	10	13	14	15	17
22	Measles	11	9	4	6	7	4	10	12	6	16	14	6	5	10	24
23	Typho-mal. fever ‡	16	10	4	4	4	5	6	7	16	15	16	16	16	20	18
24	Inflam. of brain ‡	5	4	3	3	3	3	4	5	5	5	6	5	6	7	6
25	Puerperal fever	5	4	2	2	3	4	3	4	5	4	6	5	6	7	7
26	Membranous croup	5	3	2	2	2	3	4	4	3	4	4	5	5	6	6
27	Cerebro-spi. men.	4	3	0.8	1	2	2	3	3	3	3	3	4	6	7	5
28	Small-pox	0.7	0.2	0.3	0.6	0.3	.02	0	0.1	.03	.03	.02	0.4	0.2	0.1	0.3
	No. of reports received	§4,588	§5,162	4,395	5,572	5,853	5,281	4,291	4,939	5,000	5,047	4,896	5,583	5,108	3,957	4,458

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* For 1895 the number of observers, reports, weeks in each month, etc., are stated in the first five columns of Exhibit III., the names of the observers and the number of the reports received from each are stated in Exhibit V.

† The numbers opposite the names of the diseases do not state what per cent of the whole number of reports for the year stated the disease to be present at some time during the year, but state (on an average for twelve months of the year), what per cent of reports for the several months stated the disease to be present in those months. The column for each year is thus a statement for an average month of that year. On the two following pages of this table, however, the columns for each month state what per cent of the reports for that month (the number of which is stated at the foot of the column) stated the given disease to be present in that month. [‡ For foot-note see a subsequent page.] § Average per year.

EXHIBIT IV.—CONTINUED.—*Stating for each of 28 Diseases by months, on what Per and 1895; also the Averages by Months for the Periods of nine*

What Per Cent of the Reports Received Stated Presence of the Disease.‡

Line number.	January.*					February.*					March.*				
	Diseases.	Av. '77-94.	Av. '86-94.	1895.	1894.	Diseaases.	Av. '77-94.	Av. '86-94.	1895.	1894.	Diseases.	Av. '77-94.	Av. '86-94.	1895.	1894.
	Average Disease†.	28	24	20	20	Average Disease†.	28	24	21	19	Average Disease†.	28	25	22	20
1	Influenza	62	65	67	87	Influenza	64	67	74	75	Influenza	61	64	84	66
2	Bronchitis	73	69	66	63	Bronchitis	74	70	71	60	Bronchitis	73	69	70	61
3	Rheumatism	72	70	60	65	Rheumatism	71	70	64	67	Rheumatism	73	72	69	69
4	Neuralgia	68	67	58	63	Neuralgia	70	69	63	59	Neuralgia	71	70	69	64
5	Tonsillitis	59	58	54	54	Tonsillitis	59	58	54	51	Tonsillitis	59	58	55	50
6	Pneumonia	53	46	39	37	Pneumonia	56	47	42	32	Pneumonia	53	43	45	30
7	Consumption, pul.	57	49	33	36	Consumption, pul.	58	48	31	33	Consumption, pul.	59	50	33	33
8	Pleuritis	---	25	25	17	Diarrhea	27	27	28	17	Diarrhea	29	29	29	24
9	Diarrhea	27	27	23	26	Inflam. of kidney	22	20	25	20	Pleuritis	---	25	27	17
10	Scarlet fever	18	12	18	9	Pleuritis	---	25	22	16	Inflam. of kidney	23	22	24	22
11	Inflam. of kidney	21	20	17	17	Remittent fever	31	22	15	14	Intermittent fever	49	34	16	25
12	Intermittent fever	46	32	17	12	Intermittent fever	47	32	13	16	Remittent fever	32	23	15	14
13	Remittent fever	31	23	17	12	Erysipelas	25	23	11	14	Scarlet fever	18	12	14	13
14	Whooping-cough	15	10	15	8	Whooping-cough	16	11	11	8	Erysipelas	26	23	11	16
15	Diphtheria	19	10	10	5	Inflam of bowels	12	12	10	11	Whooping-cough	16	11	9	8
16	Erysipelas	25	22	8	15	Scarlet fever	18	11	10	14	Inflam. of bowels	14	13	9	14
17	Typhoid fev. (ent.)	9	7	8	7	Dysentery	6	6	7	2	Measles	15	14	5	9
18	Inflam. of bowels	13	13	6	13	Diphtheria	17	8	6	8	Diphtheria	15	7	5	8
19	Cholera morbus	3	3	5	2	Cholera morbus	4	3	6	1	Typhoid fev. (ent.)	5	4	5	4
20	Dysentery	7	6	5	5	Typhoid fev. (ent.)	7	5	5	5	Dysentery	7	6	4	4
21	Puerperal fever	5	5	4	3	Inflam. of brain	6	5	4	3	Inflam. of brain	6	5	3	3
22	Measles	9	8	3	2	Measles	13	12	4	5	Cholera morbus	5	3	3	3
23	Membran. croup	9	6	2	3	Puerperal fever	5	4	4	3	Membran. croup	6	4	2	1
24	Typho-mal. fever	13	7	2	1	Typho-mal. fever	11	6	3	1	Typho-mal. fever	10	6	2	2
25	Inflam of brain	5	4	2	2	Membran. croup	8	5	3	2	Puerperal fever	6	5	2	1
26	Cholera infantum	2	2	2	1	Cholera infantum	1	1	1	0	Cerebro-spi. men	4	3	2	1
27	Small-pox	1.1	0.4	1	0	Small-pox	0.9	0.6	1	0	Cholera infantum	2	1	1	1
28	Cerebro-spi. men.	3	2	1	1	Cerebro-spi. men.	4	3	1	0.3	Small-pox	0.6	0.2	1	1
	Reports received§	378	412	452	487	Reports received§	348	392	367	383	Reports received§	369	412	341	384

Line number.	April.*					May.*					June.*				
	Diseases.	Av. '77-94.	Av. '86-94.	1895.	1894.	Diseases.	Av. '77-94.	Av. '86-94.	1895.	1894.	Diseases.	Av. '77-94	Av. '86-94	1895.	1894.
	Average Disease†.	27	24	22	20	Average Disease†.	26	23	19	19	Average Disease†.	25	21	18	18
1	Influenza	53	55	80	55	Rheumatism	71	71	66	67	Rheumatism	67	67	58	60
2	Rheumatism	74	73	69	66	Neuralgia	65	64	63	57	Neuralgia	62	60	57	51
3	Bronchitis	69	67	66	58	Bronchitis	60	59	56	49	Bronchitis	51	48	47	42
4	Neuralgia	71	69	65	61	Influenza	39	40	50	38	Diarrhea	42	39	44	39
5	Tonsillitis	54	54	55	50	Tonsillitis	47	47	45	44	Tonsillitis	39	37	38	30
6	Pneumonia	47	38	35	30	Diarrhea	34	32	30	27	Consumption, pul.	56	46	30	37
7	Consumption, pul.	61	52	34	41	Consumption, pul.	58	49	29	40	Intermittent fever	61	40	27	26
8	Diarrhea	31	30	33	26	Inflam. of kidney	24	23	24	23	Influenza	27	26	27	21
9	Inflam. of kidney	24	24	24	21	Intermittent fever	60	39	22	24	Remittent fever	38	25	23	20
10	Erysipelas	26	24	19	14	Pneumonia	35	29	19	24	Inflam. of kidney	21	21	20	21
11	Pleuritis	---	23	19	19	Remittent fever	36	25	18	14	Erysipelas	22	20	19	12
12	Intermittent fever	56	39	19	24	Erysipelas	24	22	17	16	Cholera morbus	16	14	17	14
13	Scarlet fever	18	13	16	17	Pleuritis	---	18	16	14	Pleuritis	---	14	14	11
14	Remittent fever	35	25	13	17	Scarlet fever	16	12	13	16	Cholera infantum	9	8	13	8
15	Inflam. of bowels	12	12	13	14	Inflam. of bowels	13	13	10	12	Inflam. of bowels	15	14	11	13
16	Whooping-cough	15	12	9	12	Whooping-cough	16	13	8	12	Scarlet fever	14	10	11	15
17	Typhoid fev. (ent.)	5	3	8	2	Cholera morbus	7	7	7	8	Dysentery	12	10	9	7
18	Measles	20	17	6	15	Measles	23	19	7	19	Whooping-cough	16	12	9	12
19	Dysentery	7	6	5	4	Dysentery	8	7	5	5	Pneumonia	21	16	8	15
20	Membran. croup	6	4	5	2	Cholera infantum	3	3	5	4	Measles	19	16	8	13
21	Diphtheria	14	7	4	6	Inflam. of brain	5	5	3	4	Diphtheria	11	6	4	7
22	Cholera morbus	5	4	4	6	Typhoid fev. (ent.)	5	4	3	6	Inflam of brain	5	5	3	4
23	Inflam of brain	6	5	3	6	Puerperal fever	5	4	2	2	Typhoid fev. (ent)	5	5	3	5
24	Typho-mal. fever	9	6	3	1	Typho-mal. fever	9	5	1	1	Puerperal fever	5	5	3	4
25	Puerperal fever	5	5	3	1	Cerebro-spi. men.	5	3	1	1	Membran. croup	3	2	1	2
26	Cholera infantum	2	1	2	2	Diphtheria	12	7	1	6	Typho-mal fever	9	5	0.3	2
27	Cerebro-spi. men.	5	3	2	3	Membran. croup	4	3	1	3	Cerebro-spi. men.	4	2	0	1
28	Small-pox	1	0.2	0	1	Small-pox	1.4	0.2	0	1	Small-pox	1.2	0.3	0	2
	Reports received§	325	354	267	369	Reports received§	377	426	341	523	Reports received§	372	426	341	453

* For 1895 the number of observers, reports, weeks in each month, etc., are stated in the first five columns of Exhibit III.; the names of observers and the number of reports received from each are stated in Exhibit V.

Cent of the Reports Received the Dieeases stated to be Present in each of the years 1894 years, 1886-1894, and for the Period of eighteen years, 1877-1894.

What Per Cent of the Reports Received Stated Presence of the Disease.‡															
July.*					August.*					September.*					
Diseases.	Av. '77–94.	Av. '86–94.	1895.	1894.	Diseases.	Av. '77–94.	Av. '86–94.	1895.	1894.	Diseases.	Av. '77–94	Av '86–94	1895.	1894.	Line number.
Average Disease†.	26	22	19	18	Average Disease†.	29	25	20	20	Average Disease†.	29	25	19	22	
Diarrhea	68	63	64	55	Diarrhea	83	80	73	72	Diarrhea	78	75	71	71	1
Rheumatism	61	61	53	58	Rheumatism	58	58	53	54	Rheumatism	61	61	53	53	2
Neuralgia	59	58	51	51	Neuralgia	56	56	49	47	Neuralgia	58	57	45	52	3
Bronchitis	42	41	34	32	Dysentery	49	43	42	38	Cholera infantum	34	33	40	33	4
Tonsillitis	33	33	32	32	Cholera infantum	44	40	37	38	Cholera morbus	38	36	38	37	5
Cholera morbus	41	35	30	27	Cholera morbus	53	49	37	38	Dysentery	45	41	38	40	6
Intermittent fever	63	43	30	28	Bronchitis	40	39	34	36	Bronchitis	47	46	35	43	7
Consumption, pul.	54	44	29	39	Tonsillitis	32	31	31	30	Tonsillitis	36	35	26	31	8
Dysentery	27	22	27	20	Consumption, pul.	52	44	28	35	Intermittent fever	63	43	26	29	9
Cholera infantum	28	25	27	22	Intermittent fever	64	44	27	28	Consumption, pul.	53	44	25	37	10
Remittent fever	40	27	25	20	Remittent fever	46	33	20	23	Remittent fever	49	35	24	28	11
Influenza	19	17	19	15	Typhoid fev. (ent.)	13	13	19	15	Typhoid fev. (ent.)	20	18	23	23	12
Inflam. of kidney	19	18	17	15	Influenza	19	17	17	18	Inflam. of kidney	16	15	16	13	13
Pleuritis	...	11	13	10	Inflam. of kidney	17	16	17	13	Inflam. of bowels	16	17	16	15	14
Erysipelas	19	16	13	10	Inflam. of bowels	20	19	16	18	Influenza	27	25	14	23	15
Typhoid fev. (ent.)	7	6	13	7	Erysipelas	17	15	12	9	Pleuritis	...	11	9	11	16
Whooping-cough	18	15	12	12	Pleuritis	...	9	9	7	Whooping-cough	17	13	9	13	17
Inflam. of bowels	17	16	10	13	Whooping-cough	18	15	9	13	Scarlet fever	11	8	8	14	18
Pneumonia	13	10	8	9	Scarlet fever	9	6	6	11	Erysipelas	16	15	7	13	19
Typho-mal. fever	12	7	5	3	Diphtheria	11	6	5	7	Typho-mal. fever	30	19	5	11	20
Scarlet fever	11	7	5	12	Pneumonia	11	9	5	7	Diphtheria	12	7	4	8	21
Diphtheria	11	6	4	4	Inflam. of brain	5	4	5	4	Pneumonia	15	12	4	10	22
Measles	12	9	4	5	Typho-mal. fever	20	14	5	6	Inflam. of brain	5	4	3	5	23
Inflam. of brain	5	5	3	2	Measles	6	4	2	2	Measles	4	2	2	1	24
Membran. croup	2	1	1	1	Cerebro-spi. men.	4	3	1	3	Cerebro-spi. men.	4	2	1	2	25
Puerperal fever	4	4	1	2	Membran. croup	2	1	1	0.3	Puerperal fever	4	3	1	1	26
Cerebro-spi. men.	3	2	1	1	Puerperal fever	4	3	1	2	Membran. croup	3	2	1	0	27
Small-pox	0.9	0.2	0	1	Small-pox	0.4	0.2	0	0.5	Small-pox	0.3	.09	0.3	0	28
Reports received§	399	445	341	485	Reports received§	427	492	366	603	Reports received§	396	452	378	473	

October.*					November.*					December.*					
Diseases.	Av. '77–94.	Av. '86–94.	1895.	1894.	Diseases.	Av. '77–94.	Av. '86–94.	1895.	1894.	Diseases.	Av. '77–94.	Av. '86–94.	1895.	1894.	Line number.
Average Disease†.	28	23	19	20	Average Disease†.	26	22	17	19	Average Disease†	26	23	18	19	
Rheumatism	66	66	60	58	Rheumatism	69	67	61	64	Rheumatism	71	69	60	64	1
Neuralgia	62	60	53	56	Bronchitis	64	60	52	53	Neuralgia	67	64	56	52	2
Diarrhea	54	51	50	49	Neuralgia	66	63	52	57	Tonsillitis	58	57	53	49	3
Bronchitis	54	54	44	52	Tonsillitis	54	52	45	46	Bronchitis	68	65	52	57	4
Tonsillitis	45	44	36	40	Influenza	41	41	41	40	Influenza	52	55	50	51	5
Typhoid fev. (ent.)	22	20	31	24	Consumption, pul.	54	44	24	33	Consumption, pul.	54	45	24	29	6
Remittent fever	47	34	28	28	Typhoid fev (ent.)	19	16	24	17	Diarrhea	27	27	24	24	7
Influenza	32	30	26	29	Inflam. of kidney	19	19	21	18	Pneumonia	39	33	22	27	8
Consumption, pul.	54	43	25	34	Diarrhea	34	32	21	26	Remittent fever	34	24	22	21	9
Dysentery	23	21	25	20	Remittent fever	39	29	21	23	Erysipelas	22	21	21	14	10
Intermittent fever	61	41	23	27	Intermittent fever	54	36	20	21	Inflam. of kidney	20	19	21	15	11
Inflam. of kidney	18	17	18	14	Pneumonia	29	24	18	21	Pleuritis	...	21	19	13	12
Cholera morbus	15	13	14	13	Pleuritis	...	16	17	15	Intermittent fever	47	31	19	20	13
Cholera infantum	12	11	13	13	Scarlet fever	15	11	16	17	Typhoid fev. (ent.)	13	11	14	13	14
Scarlet fever	14	11	13	17	Erysipelas	21	19	12	13	Scarlet fever	15	12	13	17	15
Inflam. of bowels	14	14	13	11	Inflam. of bowels	13	12	10	11	Whooping-cough	15	10	8	14	16
Pleuritis	...	14	11	12	Diphtheria	21	11	6	11	Inflam. of bowels	13	13	8	8	17
Typho-mal. fever	32	19	10	8	Dysentery	11	10	6	9	Diphtheria	20	10	5	12	18
Erysipelas	19	17	10	10	Whooping-cough	15	10	5	14	Cholera morbus	5	4	4	4	19
Pneumonia	19	16	9	13	Typho-mal. fever	24	13	4	7	Measles	6	5	3	2	20
Diphtheria	19	10	6	9	Cholora morbus	6	5	4	5	Dysentery	7	6	2	4	21
Inflam. of brain	4	4	4	3	Puerperal fever	4	3	3	3	Puerperal fever	4	4	2	5	22
Whooping-cough	14	10	4	13	Inflam. of brain	4	4	2	2	Inflam. of brain	5	4	2	2	23
Puerperal fever	4	4	2	2	Measles	5	4	2	1	Membran. croup	8	5	2	2	24
Membran. croup	5	4	0.7	4	Cholera infantum	4	3	1	2	Typho-mal. fever	16	8	1	5	25
Cerebro-spi. men.	3	2	0.5	1	Membran. croup	7	5	1	4	Cerebro-spi. men.	3	2	0.3	0.5	26
Small-pox	0.3	0.2	0.5	1	Cerebro-spi. men.	2	2	1	1	Cholera infantum	2	2	0	1	27
Measles	4	3	0.2	0.4	Small-pox	0.5	0.3	0	1	Small-pox	0.5	0.3	0	0	28
Reports received§	412	463	432	541	Reports received§	394	456	335	446	Reports received§	392	432	322	425	

† The numbers in this line are an average, not for all diseases represented, but only for those reported present in the given month. ‡ See foot-note with this mark on a subsequent page.

§ The numbers in this line state how many reports were received for the month in the given year.

*†‡ These notes on page 89.

EXHIBIT V.—*By Months and by Geographical Divisions of the State,* the Names of 185 Observers, whose Weekly Reports of Diseases for 1895 are Compiled in Tables 1, 2, 3 and 4, the Localities[a] for which they Report, and the Number of Reports Received from each Observer.*

Divisions and localities represented and physicians who reported. (Health Officers in Italics.)	Weekly Reports in 1895.—Compiled in this Article.												
	Year, 1895.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
All localities	4,394	452	367	341	267	341	341	452	366	378	432	335	322
Upper Peninsular Division *	194	35	28	30	25	16	10	17	14	8	4	3	4
Calumet, Chas. W. Niles, M. D.	34	5	4	4	4	5	3	5	4	----	----	----	----
Gladstone, *Chas. A. Chase, M. D.*	15	----	----	----	----	----	----	5	4	3	----	3	----
Houghton, *H. W. Jones, M. D.*	16	5	3	3	2	3	----	----	----	----	----	----	----
Iron Mountain, *J. F. Menistrina, M. D.*	18	5	3	4	4	----	2	----	----	----	----	----	----
Ishpeming, *G. G. Barnett, M. D.*	18	5	4	4	2	----	----	----	3	----	----	----	----
Lake Linden, *G. W. Orr, M. D.*	12	5	3	4	----	----	----	----	----	----	----	----	----
Menominee, *Walter R. Hicks, M. D.*	17	5	4	4	4	----	----	----	----	----	----	----	----
Norway, *J. B. Brasseur, M. D.*	7	----	----	----	3	4	----	----	----	----	----	----	----
Richmond Tp., *H. M. Haskell, M. D.*	20	----	3	3	2	----	2	3	3	2	----	----	2
Rockland Tp., *W. C. Gates, M. D.*	20	----	----	----	----	4	3	4	----	3	4	----	2
Sault Ste. Marie, *C. J. Ennis, M. D.*	17	5	4	4	4	----	----	----	----	----	----	----	----
Northwestern Division *	123	14	10	8	10	10	7	14	8	10	13	9	10
Cadillac, *David Ralston, M. D.*	16	5	2	----	2	----	----	----	----	----	3	2	2
Fife Lake, Lewis S. Walter, M. D.	50	5	4	4	4	5	3	5	4	4	5	3	4
Manistee, *D. E. Robinson, M. D*	14	4	4	4	2	----	----	----	----	----	----	----	----
Manistee, *J. Kinsley, M. D.*	37	----	----	----	2	5	4	5	4	4	5	4	4
Manton, *V. F. Huntley, M. D.*	6	----	----	----	----	----	----	4	----	2	----	----	----
Northeastern Division *	84	10	8	8	4	5	6	10	8	8	9	4	4
Alpena, *James Eakins, M. D.*	13	5	4	4	----	----	----	----	----	----	----	----	----
Harrisville, *D. W. Mitchell, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Rogers City, *Edward Erskine, Jr., M. D.*	19	----	----	----	----	----	2	5	4	4	4	----	----
Northern Division *	219	18	15	12	19	29	22	19	18	16	17	15	19
Bellaire, *Arthur T. Bodle, M. D.*	36	----	----	----	2	5	4	5	4	4	4	4	4
Boyne City, *A. J. Delacy, M. D.*	29	----	----	----	----	5	4	5	3	4	4	----	4
Cheboygan, *W. F. Reed, M. D.*	16	5	4	4	3	----	----	----	----	----	----	----	----
East Jordan, *Frank A. Foster, M D.*	50	5	4	4	4	5	4	4	4	4	4	4	4
Harbor Springs, *Robert E. Flood, M. D.*	4	----	----	----	----	----	2	----	2	----	----	----	----
Kalkaska, *R. S. Trask, M. D.*	50	5	4	4	3	5	4	5	3	4	5	4	4
Petoskey, J. J. Reycraft, M. D.	22	3	----	----	4	5	2	----	2	----	----	3	3
Petoskey, *O. L. Ramsdell, M. D.*	6	----	3	----	3	----	----	----	----	----	----	----	----
Petoskey, *J. E. Rankin, M. D.*	6	----	----	----	----	4	2	----	----	----	----	----	----
Northern Central Division *	190	5	4	6	5	12	21	30	26	24	22	19	16
Big Rapids, *W. A. Whitney, M. D.*	10	----	----	3	3	4	----	----	----	----	----	----	----
Big Rapids, *E. A. Romig, M. D.*	22	----	----	----	----	----	4	3	4	4	4	3	----
Clare, *P. E. Witherspoon, M. D.*	30	----	----	----	----	----	4	5	4	4	5	4	4
Farwell, *L. L. Kelly, M. D*	16	----	----	----	----	----	3	5	4	4	----	----	----
LeRoy, *U. S. Barr, M. D.*	34	----	----	----	2	5	4	4	4	4	3	4	4
McBain, *H. C. Burson, M. D*	8	----	----	----	----	----	----	5	3	----	----	----	----
Mt. Pleasant, *C. D. Pullen, M. D.*	12	5	4	3	----	----	----	----	----	----	----	----	----
Mt. Pleasant, *A. T. Getchell, M. D.*	31	----	----	----	----	3	4	3	4	4	5	4	4
Roscommon, *J. A. Fraser, M. D.*	27	----	----	----	----	----	2	5	3	4	5	4	4
Western Division *	325	47	39	37	18	22	15	28	18	29	30	19	23
Caledonia, *A. G. Graybill, M. D.*	13	5	4	4	----	----	----	----	----	----	----	----	----
Cannonsburg, C. R. Crosby, M. D.	42	4	4	4	4	4	----	5	4	4	3	3	3
Casnovia, *T. M. Koon, M. D.*	15	3	----	----	----	----	4	----	----	3	5	----	----
Fremont, *Van N. Miller, M. D.*	22	----	----	----	----	----	----	4	3	3	4	4	4
Grand Haven, *Wm. F. Reus, M. D.*	50	5	4	4	4	4	4	5	4	4	5	3	4
Grand Rapids, A. Hazelwood, M. D.	48	4	4	3	4	5	3	5	4	4	5	3	4
Ludington, *A. P. McConnell, M. D.*	19	5	4	4	4	----	2	----	----	----	----	----	----
Ludington, *E. N. Dundas, M. D.*	32	----	----	----	----	5	2	5	3	4	5	4	4
Luther, *Earl Fairbanks, M. D.*	29	3	3	4	2	4	----	4	----	3	----	2	4
North Muskegon, *P. W. Pearsall, M. D.*	13	5	4	4	----	----	----	----	----	----	----	----	----
Rockford, *H. O. Sarber, M D.*	10	4	4	2	----	----	----	----	----	----	----	----	----
Scottville, *W. C. Martin, M. D.*	12	4	4	4	----	----	----	----	----	----	----	----	----
Scottville, *O. A. Eaton, M. D.*	7	----	----	----		----	----	----	----	4	3	----	----
White Cloud, *W. A. Kuhn, M. D.*	13	5	4	4	----	----	----	----	----	----	----	----	----

[a] In many cases the reports include sickness in the vicinity as well as the corporate limits of the places named.

* For counties in each division see Exhibit I.

EXHIBIT V.—Continued.

Divisions and localities represented and physicians who reported. (Health Officers in Italics.)	Weekly Reports in 1895.—Compiled in this Article.												
	Year, 1895.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Central Division*	937	81	65	52	47	60	78	100	82	93	105	93	81
Alma, I. N. Brainard, M. D.	7	3	4	----	----	----	----	----	----	----	----	----	----
Alma, *J. F. Suydam, M. D.*	44	5	4	4	4	5	4	5	4	4	5	----	----
Belding, *D. I. Morris, M. D.*	21	----	----	----	----	----	4	----	----	4	5	4	4
Bellevue, *A. S. Wilson, M. D.*	13	----	----	----	----	----	----	5	4	4	----	----	----
Brighton, *H. M. Ptolmey, M. D.*	18	----	----	----	----	----	----	4	3	2	5	4	----
Charlotte, *H J. Emery, M. D.*	6	4	2	----	----	----	----	----	----	----	----	----	----
Charlotte, *E. C. Palmer, M. D.*	21	----	----	----	----	----	3	----	2	4	5	3	4
Elsie, *James H. Travis, M. D.*	24	----	----	----	----	----	3	----	4	4	5	4	4
Flint, *Noah Bates, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Flushing, *L. A. Steel, M. D.*	8	----	----	----	----	----	----	----	----	----	----	4	4
Fowlerville, *A S. Austin, M. D.*	7	----	----	----	----	4	3	----	----	----	----	----	----
Gaines, *J D. Mathews, M. D.*	8	----	----	----	----	----	----	----	4	4	----	----	----
Gaines, *G. H. Alway, M. D.*	8	----	----	----	----	----	----	----	----	----	----	4	4
Hamburg, *J. N. Swartz, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Hastings, *M. C. Woodmansee, M. D.*	14	5	4	3	2	----	----	----	----	----	----	----	----
Hastings, *Clarence H. Barber, M. D.*	28	----	----	----	----	----	3	5	4	4	5	3	4
Howard City, *James Totten, M. D.*	16	----	----	----	----	----	----	----	----	3	5	4	4
Ionia, *Henry Tremayne, M. D.*	29	----	----	----	----	----	3	5	4	4	5	4	4
Lakeview, *A. H. Forsyth, M. D.*	13	5	4	4	----	----	----	----	----	----	----	----	----
Lakeview, *F. R. Blanchard, M. D.*	32	----	----	----	4	5	4	5	4	4	----	3	3
Linden, *M. E. Topping, M. D.*	28	----	----	----	----	----	4	5	3	4	5	4	3
Lyons, *B. M. Hutchinson, M. D.*	31	5	4	4	4	4	4	4	----	2	----	----	----
Maple Rapids, *G. C. Young, M. D.*	8	5	3	----	----	----	----	----	----	----	----	----	----
Maple Rapids, *A. O. Hart, M. D.*	23	----	----	----	----	----	3	5	3	3	3	4	2
McBride, *D. C Bell, M. D.*	21	----	----	----	----	3	----	----	3	3	4	4	4
Middleville, *Geo W. Matteson, M. D.*	51	5	4	4	4	5	4	4	4	4	5	4	4
Mt. Morris, *H. W. Graham, M. D.*	11	5	4	2	----	----	----	----	----	----	----	----	----
Nashville, *W. H. Young, M. D.*	35	----	----	----	----	5	4	5	4	4	5	4	4
Ovid, *James E. Taylor, M. D.*	16	5	4	4	3	----	----	----	----	----	----	----	----
Perry, *H. W. Cobb, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Potterville, *E. R. Espie, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Portland, *R. W. Alton, M. D.*	14	5	4	3	2	----	----	----	----	----	----	----	----
Stanton, *W. P. Gamber, M. D*	52	5	4	4	4	5	4	5	4	4	5	4	4
Stanton, *Allen N. Corey, M. D.*	23	----	----	----	----	----	3	5	----	3	5	4	3
Stockbridge, *Christopher Brogan, M. D.*	18	----	----	----	----	----	----	4	2	2	5	3	2
St. Louis, *Geo. W. Pettey, M. D.*	15	----	----	----	----	----	3	4	3	----	3	2	----
Vermontville, *Chas. S. Snell, M. D.*	16	----	----	----	----	----	2	5	3	3	----	3	----
Vernon, *W. H. Holtzman, M. D.*	50	4	4	4	4	4	4	5	4	4	5	4	4
Bay and Eastern Division*	601	69	58	48	34	42	43	63	47	45	66	44	42
Almont, *D. H. Burley, M. D.*	15	5	4	2	2	----	2	----	----	----	----	----	----
Almont, *Adam Price, M. D.*	23	----	----	----	----	----	----	5	2	4	4	4	4
Attica Tp., *Chas. Buddington, M. D.*	5	----	----	----	----	----	----	----	----	2	3	----	----
Bay City, *Wm. Kerr, M. D.*	19	----	----	----	----	----	2	5	4	4	4	----	----
Cass City, *N. McClinton, M. D.*	20	3	3	3	----	----	----	----	----	----	4	3	4
Cass City, *J. M. Truscott, M. D.*	20	----	----	----	3	5	4	5	3	----	----	----	----
Chapin township, *T. N. Jeffery, M. D.*	7	----	4	3	----	----	----	----	----	----	----	----	----
Chesaning, *D. W. Mudge, M. D.*	25	5	4	3	----	----	----	----	----	4	5	4	----
Columbiaville, *Edwin Conley, M. D.*	13	5	4	4	----	----	----	----	----	----	----	----	----
Columbiaville, *C. A. Wisner, M. D.*	12	----	----	----	----	----	----	----	----	----	4	4	4
Croswell, *T. S. Kingston, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Deckerville, *Geo. C. Vincent, M. D.*	42	5	4	4	4	4	2	5	2	3	3	2	4
Emmet, *A. J. Abbott, M. D.*	19	----	4	3	----	----	----	----	3	2	5	2	----
Fremont Tp. (Tuscola Co.), *Benj. D'Arcy, M. D.*	15	----	----	----	----	----	----	----	----	2	5	4	4
Marine City, *C. W. Shaver, M. D.*	14	5	4	2	3	----	----	----	----	----	----	----	----
Marine City, *F. Blagborne, M. D.*	33	----	----	----	----	3	4	5	4	4	5	4	4
Metamora, *G. W. Stone, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Oakley, *E. Elliott, M. D.*	11	5	4	----	2	----	----	----	----	----	----	----	----
Oakley, *E. L. Emmons, M. D.*	17	----	----	----	----	5	4	5	3	----	----	----	----
Port Austin, *Sarah A. Cole, M. D.*	11	5	4	2	----	----	----	----	----	----	----	----	----
Port Hope, *C. W. Armitage, M. D.*	7	----	----	----	----	----	----	4	3	----	----	----	----
Port Huron, *C. Edson Covey, M. D*	4	4	----	----	----	----	----	----	----	----	----	----	----
Port Huron, *H. R. Mills, M. D.*	10	----	----	4	4	----	2	----	----	----	----	----	----
Saginaw (W. S.), *E. E. Curtis, M. D.*	47	5	4	3	----	5	4	5	4	4	5	4	4
Thornville, *J. S. Caulkins, M. D.*	47	4	3	4	4	5	4	4	4	4	4	3	4
Unionville, *J. Wood, M. D.*	4	4	----	----	----	----	----	----	----	----	----	----	----
Unionville, *W. C. Wright, M. D.*	32	----	----	3	4	----	3	5	4	4	5	2	2
Yale, *Will H. Gowan, M. D.*	8	4	4	----	----	----	----	----	----	----	----	----	----
Yale, *C. V. High, M. D.*	17	----	----	----	----	5	4	5	3	----	----	----	----

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* For counties in each division see Exhibit I.

EXHIBIT V.—CONCLUDED.

Divisions and localities represented and physicians who reported. (Health Officers in Italics.)	Weekly Reports in 1895.—Compiled in this Article. Year, 1895.	Jan.	Feb.	Mar.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Southwestern Division*	362	38	25	28	19	33	31	31	31	31	39	27	29
Bangor, *Joel Camp, M. D.*	14	4	4	3	3								
Benton Harbor, *F. A. Votey, M. D.*	27	5	2	3		5	2		3	3	4		
Berrien Springs, *W. F. Mason, M. D.*	21						2	3	2	3	4	4	3
Decatur, *J. E. Maxwell, M. D.*	9							5	4				
Fennville, *W. H. Andrews, M. D.*	14						3	4	3	2			2
Hartford, *H. C. Maynard, M. D.*	38	4		3	2	4	4		4	4	5	4	4
Lawrence, *A. S. Haskins, M. D.*	8						2			3	3		
Marcellus, *Fred Shellito, M. D.*	18						3	4			3	4	4
Niles, *John D. Greenamyer, M. D.*	13	5	4	4									
Otsego, *M. Chase, M. D.*	21	5	4	4	4	4							
Paw Paw, *Wilbur F. Hoyt, M. D.*	20								4	4	5	3	4
Saugatuck, *H. H. Stimson, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
South Haven, *W. G. Triece, M. D.*	11	5	3	3									
South Haven, *M. E. Bishop, M. D.*	35				2	5	3	5	3	4	5	4	4
Vandalia, *Leander Osborn, M. D.*	9					5	4						
Watervliet, *W. L. Garatt, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Southern Central Division*	869	92	73	72	55	63	68	87	75	72	79	71	62
Augusta, *C. E. Doyle, M. D.*	7	5		2									
Blissfield, *J. M. Barnes, M. D.*	47		4	4	4	5	4	5	4	4	5	4	4
Bronson, *J. E. Outwater, M. D.*	31				2	5	4	5	4	4		3	4
Brooklyn, *E. N. Palmer, M. D.*	7	5		2									
Burr Oak, *C. D. Parsons, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Burr Oak Tp., *J. C. Rollman, M. D*	51	5	4	4	4	5	4	5	4	3	5	4	4
Clayton, *E. J. C. Ellis, M. D.*	28	3	3	3		3	3	4	4			2	3
Clinton, *John E. White, M. D.*	15	5	4	4	2								
Clinton, *John L. Tuttle, M. D.*	4											4	
Coldwater, *W. L. Ford, M. D.*	11	5	4	2									
Concord, *W. N. Keeler, M. D.*	15	5	4	4	2								
Concord, *M. L. Bacon, M. D.*	24						4	4	3	3	5	3	2
Constantine, *B. P. Scoville, M. D.*	13						2	4	4	3			
Deerfield, *Webster Bliss, M. D.*	34					5	4	5	4	4	5	3	4
Galesburg, *O. F. Burroughs. M. D.*	6	3	3										
Galesburg, *W. L. McBeth, M. D.*	26						2	5	4	4	4	3	4
Hudson, *Geo. Chapman, M. D.*	4									2		2	
Kalamazoo, *A. Hockstein, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Litchfield, *Amos Atkinson, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Manchester, *C. F. Kapp, M. D.*	24							3	4	4	5	4	4
Marshall, *E. J. Marshall, M. D.*	25						4		4	4	5	4	4
Mendon, H. C. Clapp, M. D.	41	5	3	4	4	5	4	5	4	4	3		
Mendon, *Edwin Stewart, M. D.*	22	5	4	4	4	3	2						
Parma, *A. V. Avery, M. D.*	21				2		2	4	4	3	4	2	
Springport, *M. S. Pasco, M. D.*	26							5	4	4	5	4	4
Sturgis, *S. B. Follett, M. D.*	11	4	4	3									
Tecumseh, J. F. Jenkins, M. D.	51	5	3	4	4	5	4	5	4	4	5	4	4
Tecumseh, *F. O. Tefft, M. D.*	46	4	4	4	4	3	3	5	4	4	4	4	3
Tekonsha, *John L. Ramsdell, M. D.*	23	5	4	4	2	5	3						
Three Rivers, *A. W. Scidmore, M. D.*	15		3	4	2		3	3					
Vicksburg, *C. H. McKain, M. D.*	17	5	4	4	4								
Vicksburg, *Frank S. Coller, M. D*	36				3	4	4	5	4	4	5	3	4
White Pigeon, *T. C. Buskirk, M. D.*	7	3	2									2	
Ypsilanti, *F. K. Owen, M. D.*	13	5	4	4									
Ypsilanti, *D. A. Post, M. D.*	12									2	4	4	2
Southeastern Division*	490	43	42	40	31	49	40	53	39	42	48	31	32
Armada, *G. W. Shipman, M. D.*	9	5	4										
Dearborn, *J. E. Howe, M. D.*	14									2	5	3	4
Highland Park, *A. Stewart, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Memphis, *G. P. Hale, M. D.*	22	4	3	3		5	4	3					
Mt. Clemens, *Edward G. Folsom, M. D.*	40	5	2	4	4	5	4	5	4	4	3		
New Haven, *Alex. Gunn, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Plymouth, *J. M. Collier, M. D.*	5		2	3									
Plymouth, *H. H. Merriman, M. D.*	20					3		5	3	4	5		
Pontiac, Mason W. Gray, M. D.	44		4	3	3	4	4	5	4	4	5	4	4
Richmond, *E. B. Keeler, M. D.*	52	5	4	4	4	5	4	5	4	4	5	4	4
Romeo, *J. Greenshields, M. D.*	13	5	4	4									
Romeo, *Wm. Greenshields, M. D.*	39				4	5	4	5	4	4	5	4	4
Royal Oak, *Edwin A. Kidder, M. D.*	33					3	4	5	4	4	5	4	4
South Lyon, *L. A. Sayles, M. D.*	7		4	3									
Trenton, *Hiram Holden, M. D.*	38	5	3	4	4	5	4	5	4	4			
Warren, *J. C. Flynn, M. D.*	50	4	4	4	4	4	4	5	4	4	5	4	4

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* For counties in each division see Exhibit I.

TABLE 1.—*Stating, for each of the Thirteen Years, 1883–1895, and the Average for 1877–1894, also the Average for the period of nine years, 1886–1894, by what Per Cent of Observers each of 28 Diseases was reported present in those years (also the Average Number of Observers per Month and the Total Observers for each Year),—Compiled from Weekly Reports of Health Officers of Cities and Villages and from Regular Correspondents of the State Board of Health.*—Diseases arranged in order of Greatest Number of Observers reporting them present in 1894.—(Continued for each month of 1894 and 1895, on following pages)*

Line number.	Diseases.	Observers by whom the Several Diseases were Reported Present — Average Per Cents (per Month) of those making Reports.†														
		Av. 1877-94.	Av. 1886-94.	1895.	1894.	1893.	1892.	1891.	1890.	1889.	1888.	1887.	1886.	1885.	1884.	1883.
	Av for tabulated diseases reported pres.	38	35	30	30	31	33	37	37	36	35	37	37	38	42	43
1	Rheumatism	83	83	78	78	80	83	86	87	82	82	82	85	83	83	83
2	Neuralgia ‡	81	81	74	74	76	80	83	85	82	79	83	83	83	84	85
3	Bronchitis	74	73	69	67	72	73	75	81	75	74	69	71	70	74	79
4	Tonsillitis ‡	70	70	66	64	71	71	74	75	71	64	68	70	72	73	73
5	Diarrhea	64	63	60	58	61	63	67	68	65	60	65	64	66	71	67
6	Influenza	54	55	58	55	57	56	69	67	49	46	46	48	47	53	56
7	Pneumonia	57	45	36	36	37	43	40	50	47	49	46	48	44	48	59
8	Consumption, pul.‡	64	56	35	43	47	49	60	62	59	57	60	64	68	72	71
9	Intermittent fever	69	53	35	36	37	43	52	58	61	59	64	71	73	79	82
10	Inflam. of kidney ‡	34	34	33	31	29	36	36	36	35	33	32	35	34	41	-----
11	Pleuritis ‡	-----	32	32	28	27	35	36	35	33	32	-----	-----	-----	-----	-----
12	Remittent fever	52	40	32	31	28	34	43	40	45	49	46	48	52	60	57
13	Erysipelas	40	38	28	27	29	34	39	43	43	44	44	43	44	48	47
14	Dysentery	31	30	28	27	25	29	30	31	33	30	33	30	28	38	35
15	Cholera morbus	31	29	26	27	26	29	31	29	27	29	33	29	33	37	32
16	Inflam. of bowels ‡	29	29	25	27	25	28	31	29	29	30	32	32	32	30	31
17	Cholera infantum	22	21	22	20	18	21	23	21	21	20	24	25	21	26	24
18	Typhoid fever (ent.)	18	16	21	18	15	15	16	14	17	16	15	15	16	20	19
19	Scarlet fever	25	19	19	24	19	22	17	18	18	17	15	20	22	29	32
20	Whooping-cough	27	20	14	18	15	18	16	17	25	16	24	28	21	29	23
21	Diphtheria	26	15	10	13	13	15	13	16	12	14	18	24	27	27	31
22	Inflam. of brain ‡	12	11	8	9	8	9	11	12	13	13	15	13	14	14	12
23	Typho-mal. fever ‡	26	17	8	8	9	10	12	14	26	25	26	27	27	32	32
24	Measles	18	16	8	11	14	7	17	22	12	25	22	10	9	17	37
25	Puerperal fever	11	10	7	6	9	11	8	9	13	12	14	12	13	16	15
26	Membranous croup	12	9	4	5	5	8	10	11	7	10	10	12	10	14	14
27	Cerebro-spi. men.	8	6	2	4	5	5	6	8	7	7	7	8	12	12	11
28	Small-pox	1.2	0.3	0.5	1	0.3	.08	0	0.2	0.5	.07	.01	0.5	0.4	0.2	1
	No. of Observers	147	166	185	189	205	199	145	155	139	142	155	169	163	142	140
	Av. No. of Observers per month	93	106	94	116	113	109	91	102	100	102	114	113	104	79	88

* For 1895 the number of observers, reports, weeks in each month, etc., are stated in the first five columns of Exhibit III.; the names of the observers and the number of the reports received from each are stated in Exhibit V. †‡ Foot-notes are on page 101.

TABLE 1—CONTINUED.—[a]*Per Cent of Observers by whom the several Diseases were for the period of nine years, 1886-1894, and*

Per Cent of Observers by whom the Diseases were Reported Present.‡

Line number.	January.*					February.*					March.*				
	Diseases.	Av. '77-94.	Av. '86-94.	1895.	1894.	Diseases.	Av. '77-94.	Av. '86-94.	1895.	1894.	Diseases.	Av. '77-94.	Av. '86-94.	1895.	1894.
	Average†	39	36	31	30	Average†	38	34	30	27	Average†	39	36	31	29
1	Bronchitis	84	81	81	78	Influenza	74	77	87	87	Influenza	75	79	91	79
2	Rheumatism	87	85	78	82	Bronchitis	85	83	83	71	Neuralgia	87	86	84	78
3	Influenza	73	66	77	98	Neuralgia	84	84	81	80	Rheumatism	85	85	83	79
4	Neuralgia	84	83	77	80	Rheumatism	85	84	79	80	Bronchitis	85	83	81	76
5	Tonsillitis	80	79	77	77	Tonsillitis	78	77	76	69	Tonsillitis	79	80	73	71
6	Pneumonia	84	69	64	59	Pneumonia	85	70	63	54	Pneumonia	82	66	63	49
7	Pleuritis	---	44	46	39	Diarrhea	44	45	48	36	Diarrhea	48	49	49	42
8	Diarrhea	47	48	39	41	Pleuritis	---	42	42	30	Pleuritis	---	42	44	32
9	Consumption, pul.	66	59	38	48	Kidney, inflam. of	38	36	37	35	Consumption, pul.	68	59	39	41
10	Kidney, inflam. of	34	33	35	33	Consumption, pul.	66	57	35	39	Kidney, inflam. of	39	38	38	35
11	Scarlet fever	31	23	34	20	Fever, remittent	48	32	24	21	Erysipelas	45	44	25	34
12	Fev., intermittent	61	46	28	21	Erysipelas	44	42	22	32	Fev., intermittent	63	48	24	34
13	Fever, remittent	45	34	27	18	Bowels, inflam. of	25	24	21	20	Scarlet fever	31	22	23	22
14	Erysipelas	45	41	25	30	Fev., intermittent	60	46	19	25	Bowels, inflam. of	28	27	21	27
15	Whooping-cough	27	17	23	15	Scarlet fever	29	19	18	21	Fever, remittent	45	34	21	20
16	Bowels, inflam. of	26	27	18	30	Whooping-cough	25	17	17	12	Dysentery	15	14	13	9
17	Diphtheria	32	19	18	9	Dysentery	12	12	12	4	Whooping-cough	26	18	13	17
18	Fev., typhoid (ent.)	16	11	13	12	Cholera morbus	9	7	10	3	Measles	25	23	12	15
19	Cholera morbus	9	8	12	9	Diphtheria	28	16	10	14	Diphtheria	26	14	11	12
20	Puerperal fever	12	12	12	11	Fev., typhoid (ent.)	11	8	10	7	Brain, inflam. of	14	14	8	10
21	Dysentery	15	15	11	15	Puerperal fever	11	11	10	8	Cholera morbus	12	9	7	8
22	Measles	17	15	9	6	Brain, inflam. of	13	13	8	7	Fev., typhoid (ent.)	10	7	7	7
23	Brain, inflam. of	12	11	6	5	Measles	20	18	8	10	Puerperal fever	13	12	7	3
24	Croup, membran.	20	14	6	9	Cronp, membran.	16	12	6	5	Cholera infantum	4	3	5	3
25	Fever, typho-mal.	22	13	5	2	Fever, typho-mal.	18	10	6	2	Croup, membran.	14	11	5	2
26	Cholera infantum	5	4	4	3	Cholera infantum	4	4	4	0	Cerebro-spi. men.	10	8	4	3
27	Cerebro-spi. men.	7	6	3	3	Cerebro-spi. men.	8	7	1	1	Fever, typho-mal.	17	11	4	4
28	Small-pox	1.7	0.6	1	0	Small-pox	1.4	0.6	1	0	Small-pox	1	0.6	2	2
	Observers§	89	100	97	102	Observers§	89	100	99	103	Observers§	87	98	95	102

Line number.	April.*					May.*					June.*				
	Diseases.	Av. '77-94.	Av. '86-94.	1895.	1894.	Diseases.	Av. '77-94.	Av. '86-94.	1895.	1894.	Diseases.	Av. '77-94.	Av. '86-94.	1895.	1894.
	Average†	39	36	31	30	Average†	38	35	31	31	Average†	36	33	29	27
1	Influenza	67	69	90	66	Rheumatism	86	85	85	82	Rheumatism	83	83	77	76
2	Bronchitis	83	82	84	77	Neuralgia	82	82	81	75	Neuralgia	78	77	77	68
3	Rheumatism	87	86	81	76	Bronchitis	77	76	79	67	Bronchitis	69	68	68	59
4	Neuralgia	85	85	80	79	Influeuza	56	57	76	57	Diarrhea	64	63	64	59
5	Tonsillitis	76	76	74	71	Tonsillitis	72	72	65	73	Tonsillitis	64	63	62	53
6	Pneumonia	78	62	58	46	Diarrhea	55	53	52	48	Fev., intermittent	72	55	43	37
7	Diarrhea	50	49	54	48	Consumption, pul.	68	59	43	48	Erysipelas	41	39	40	23
8	Consumption, pul.	69	61	40	48	Kidney, inflam. of	39	39	43	39	Influenza	40	40	40	33
9	Pleuritis	---	41	36	34	Fev., intermittent	72	55	41	37	Consumption, pul.	63	55	39	45
10	Erysipelas	45	43	34	29	Pneumonia	66	52	41	46	Cholera morbus	35	31	34	27
11	Kidney, inflam. of	39	38	34	33	Erysipelas	46	43	36	36	Fever, remittent	51	39	34	29
12	Fev., intermittent	68	52	33	34	Fever, remittent	50	38	33	23	Kidney, inflam. of	36	36	32	31
13	Bowels, inflam. of	25	25	26	27	Pleuritis	---	34	33	33	Pleuritis	---	28	30	23
14	Scarlet fever	30	22	21	23	Bowels, inflam. of	28	29	27	32	Bowels, inflam. of	29	29	26	26
15	Fever, remittent	48	37	20	28	Scarlet fever	27	21	27	27	Cholera infantum	21	18	26	16
16	Dysentery	14	13	15	10	Dysentery	17	17	17	12	Dysentery	24	21	19	18
17	Whooping-cough	26	21	14	17	Cholera infantum	8	9	15	12	Pneumonia	43	32	19	25
18	Croup, membran.	13	10	11	6	Cholera morbus	18	17	15	18	Scarlet fever	23	17	18	24
19	Fev., typhoid (ent.)	9	6	11	6	Measles	35	31	13	32	Whooping-cough	27	20	15	18
20	Cholera morbus	12	10	10	11	Whooping-cough	29	22	12	21	Measles	29	25	14	21
21	Measles	31	28	9	26	Brain, inflam. of	13	12	9	12	Brain. inflam. of	12	12	7	10
22	Brain, inflam. of	14	12	8	12	Puerperal fever	12	11	9	5	Diphtheria	21	13	7	13
23	Pnerperal fever	11	13	8	5	Fev., typhoid (ent.)	9	7	8	13	Fev., typhoid (ent.)	10	9	6	9
24	Diphtheria	25	13	6	10	Cerebro-spi. men.	9	7	4	3	Puerperal fever	12	11	6	7
25	Fever, typho-mal.	16	12	6	3	Diphtheria	23	15	4	15	Croup, membran.	7	5	2	4
26	Cerebro-spi. men.	10	7	4	7	Fever, typho-mal.	17	12	3	3	Fever, typho-mal.	17	11	1	5
27	Cholera infantum	4	4	3	6	Croup, membran.	10	8	1	8	Cerebro-spi. men.	8	6	0	2
28	Small-pox	1.7	0.4	0	2	Small-pox	2.1	0.4	0	2	Small-pox	1.7	0.7	0	4
	Observers§	82	93	80	107	Observers§	90	103	75	114	Observers§	93	107	101	128

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* For 1895 the number of observers, reports, weeks in each month, etc., are stated in the first five col- stated in Exhibit V. † The numbers in this line are an average, not for all diseases represented, but

a For first part of Table 1 and full heading, see preceding page.

Reported Present by Months in each of the years 1894–95, and the Average by Months for the Period of Eighteen years, 1877–1894.

Per Cent of Observers by whom the Diseases were Reported Present.‡

July.*					August.*					September.*					
Diseases.	Av. '77-94.	Av. '86-94.	1895.	1894.	Diseases.	Av. '77-94.	Av. '86-94.	1895.	1894.	Diseases.	Av. '77-94	Av. '86-94.	1895.	1894.	Line number.
Average†	39	36	33	29	Average†	41	39	30	35	Average†	42	37	31	33	
Diarrhea	88	85	82	75	Diarrhea	95	93	86	89	Diarrhea	92	88	87	85	1
Rheumatism	79	80	76	79	Rheumatism	75	77	74	76	Rheumatism	76	78	76	70	2
Neuralgia	78	78	71	69	Neuralgia	75	76	67	73	Neuralgia	75	76	66	71	3
Tonsillitis	56	58	67	54	Dysentery	71	68	61	67	Cholera infantum	56	55	60	52	4
Cholera morbus	66	60	56	46	Tonsillitis	56	58	54	63	Dysentery	68	65	57	64	5
Bronchitis	60	60	54	50	Cholera infantum	65	63	53	59	Cholera morbus	63	60	56	60	6
Dysentery	47	42	52	36	Cholera morbus	75	73	53	64	Bronchitis	63	64	54	63	7
Cholera infantum	47	46	48	41	Bronchitis	57	59	51	60	Tonsillitis	58	57	47	51	8
Fev., intermittent	75	60	45	44	Fev., intermittent	76	61	42	47	Fev., intermittent	75	59	45	46	9
Fever, remittent	56	43	45	29	Consumption, pul.	61	54	34	42	Fev., typhoid (ent.)	30	29	36	34	10
Consumption, pul.	62	54	38	47	Fever, remittent	61	48	30	39	Bowels, inflam. of.	32	33	35	29	11
Influenza	31	29	37	25	Bowels, inflam. of	38	40	28	40	Fever, remittent	62	49	35	44	12
Erysipelas	38	34	34	21	Fev., typhoid (ent.)	23	23	28	24	Consumption, pul.	60	52	30	45	13
Pleuritis	---	22	33	20	Influenza	32	30	28	37	Kidney, inflam. of	27	26	30	23	14
Bowels, inflam. of	33	32	31	27	Erysipelas	34	32	26	20	Influenza	41	38	26	37	15
Kidney, inflam. of	34	33	29	27	Kidney, inflam. of	31	30	24	30	Pleuritis	---	22	20	21	16
Fev., typhoid (ent.)	13	13	23	15	Pleuritis	---	20	20	21	Erysipelas	32	31	19	23	17
Pneumonia	31	33	23	18	Brain, inflam. of	14	12	13	13	Whooping-cough	28	21	15	19	18
Fever, typho-mal.	21	14	15	6	Scarlet fever	18	13	13	20	Fever, typho-mal.	44	30	13	19	19
Whooping-cough	28	24	14	17	Whooping-cough	31	24	13	23	Scarlet fever	19	15	12	21	20
Scarlet fever	19	14	11	22	Pneumonia	26	20	11	18	Diphtheria	24	14	10	13	21
Brain, inflam. of	12	12	10	6	Diphtheria	21	13	10	15	Pneumonia	31	23	9	16	22
Diphtheria	20	11	9	6	Fever, typho-mal.	33	25	8	15	Brain, inflam. of	11	10	7	13	23
Measles	21	17	9	11	Measles	11	8	4	6	Puerperal fever	10	9	4	5	24
Puerperal fever	10	10	4	5	Cerebro-spi. men.	8	6	3	7	Cerebro-spi. men.	8	6	3	4	25
Cerebro-spi. men.	8	7	3	3	Croup, membran.	5	4	2	2	Croup, membran.	7	4	3	0	26
Croup, membran.	4	4	2	3	Puerperal fever	10	8	2	6	Measles	7	5	3	2	27
Small-pox	1.6	0.3	0	2	Small-pox	0.8	0.3	0	2	Small-pox	0.6	0.2	1	0	28
Observers§	97	112	97	131	Observers§	100	115	101	131	Observers§	99	115	105	128	

October.*					November.*					December.*					
Diseases.	Av. '77-94.	Av. '86-94.	1895.	1894.	Diseases.	Av. '77-94.	Av. '86-94.	1895.	1894.	Diseases.	Av. '77-94.	Av. '86-94.	1895.	1894.	Line number.
Average†	41	37	32	34	Average†	38	34	26	28	Average†	38	34	26	28	
Rheumatism	83	84	80	80	Rheumatism	83	83	77	76	Tonsillitis	79	78	76	68	1
Neuralgia	80	80	74	76	Neuralgia	82	81	68	75	Rheumatism	85	85	74	78	2
Diarrhea	78	77	73	77	Bronchitis	78	76	64	70	Neuralgia	82	81	69	69	3
Bronchitis	77	72	68	72	Tonsillitis	76	75	62	62	Bronchitis	82	80	66	72	4
Tonsillitis	69	70	67	69	Influenza	57	58	53	52	Influenza	62	71	60	66	5
Dysentery	44	42	49	43	Diarrhea	55	54	40	42	Diarrhea	47	48	38	45	6
Fev., typhoid (ent.)	33	31	49	38	Fever, remittent	54	43	35	34	Pneumonia	69	55	38	47	7
Fever, remittent	61	49	42	46	Pneumonia	57	45	34	38	Erysipelas	41	39	34	27	8
Influenza	47	46	42	48	Fev., typhoid (ent.)	28	25	32	24	Fever, remittent	49	38	34	34	9
Fev., intermittent.	74	58	39	38	Fev., intermittent.	68	52	31	33	Kidney, inflam. of	33	32	33	26	10
Kidney, inflam. of.	33	32	35	34	Kidney, inflam. of.	32	32	31	28	Pleuritis	---	38	31	23	11
Cholera morbus	32	30	34	33	Consumption, pul.	63	53	28	39	Consumption, pul.	63	54	30	34	12
Bowels, inflam. of.	29	29	29	22	Erysipelas	39	38	24	25	Fev., intermittent.	61	45	28	30	13
Consumption, pul.	63	52	29	40	Pleuritis	---	32	23	29	Fev., typhoid (ent.)	20	17	20	21	14
Pleuritis	--	28	27	32	Bowels, inflam. of.	26	25	21	18	Scarlet fever	28	23	18	29	15
Cholera infantum	26	25	26	27	Scarlet fever	24	19	21	29	Bowels, inflam. of.	27	27	16	18	16
Erysipelas	38	35	25	21	Dysentery	23	22	13	21	Whooping-cough	24	16	11	17	17
Pneumonia	41	33	23	28	Cholera morbus	15	14	10	11	Cholera morbus	12	11	9	10	18
Fever, typho-mal.	46	31	17	18	Diphtheria	32	19	9	17	Dysentery	14	14	8	7	19
Scarlet fever	23	19	17	30	Whooping-cough	25	18	9	19	Diphtheria	32	19	8	17	20
Diphtheria	31	18	14	17	Fever, typho-mal.	34	21	7	13	Puerperal fever	10	10	7	9	21
Brain, inflam. of	10	10	13	10	Puerperal fever	11	10	7	8	Brain, inflam. of	11	11	6	7	22
Whooping-cough	25	17	7	18	Brain, inflam. of	10	9	6	4	Measles	12	9	6	4	23
Puerperal fever	11	10	5	8	Measles	9	7	4	3	Croup, membran.	18	13	5	5	24
Croup, membran.	12	10	3	10	Cholera infantum.	9	8	3	5	Fever, typho-mal.	26	15	5	8	25
Cerebro-spi. men.	7	5	2	5	Cerebro-spi. men.	6	5	2	3	Cerebro-spi. men.	6	5	1	2	26
Measles	7	6	1	1	Croup, membran.	16	12	2	8	Cholera infantum.	5	6	0	4	27
Small-pox	0.5	0.3	1	2	Small-pox	1	0.6	0	1	Small-pox	1.4	0.4	0	0	28
Observers§	97	111	95	115	Observers§	96	111	94	119	Observers§	94	107	87	116	

umns of Exhibit III. ; the names of observers and the number of reports received from each are only for those reported present in the given month. ‡ See foot-note with this mark on page 101.

§ The numbers in this line state how many observers reported for the month in the given year.

TABLE 2.—WEEKLY REPORTS OF DISEASES IN MICHIGAN IN 1895.—*Exhibiting for the Year and for each Month of the Year Ending Saturday, December 28, 1895, a Summary relative to diseases in the State of Michigan; also for each month a Summary relative to Diseases in each of 11 Geographical Divisions* of the State.—Indicating the prevalence as regards Time and Area. Compiled from 4,394 Weekly Reports by 185 Observers, Health Officers of Cities and Villages, Regular Correspondents of the State Board of Health, and other Physicians, Reporting the Diseases under their observation.*

Number of Observers, Reports, etc.	Diseases.	(Av.[b]) Per Cent of Observers reporting presence of.	Average Per Cent of Weeks Reported Present Where Present.[c]	Per Cent of Reports Stating Presence of.[d]	Average Order of Prevalence Where Present.[e]	Average Order of Prevalence where present.													
						1894.	1893.	1892.	1891.	1890.	1889.	1888.	1887.	1886.	1885.	1884.	1883.	Av. 1877–1894.	Av. 1886–1894.
Ending December 28, 1895.[†] localities represented, 153. localities represented per month, 91. Observers during the year, 185. Observers per month, 94. reports compiled, 4,394.[a] reports per month, 366.	Average for tabulated diseases reported present	30	64	20	3.0	3.0	3.3	3.1	3.3	3.3	3.3	3.5	3.7	3.7	3.8	4.2	4.2	3.9	3.4
	Brain, inflammation of	8	36	3	4.0	4.8	4.3	3.9	4.9	5.4	4.8	6.4	6.2	5.9	6.0	6.4	6.6	5.9	5.2
	Bowels, inflammation of	25	43	11	3.6	3.8	4.0	4.1	4.3	4.4	4.1	4.6	5.0	5.0	5.1	5.8	6.1	5.1	4.4
	Bronchitis	69	74	52	2.6	2.6	2.5	2.6	2.7	2.6	2.7	2.7	3.0	3.0	3.1	3.2	3.2	3.0	2.7
	Cerebro-spinal meningitis	2	35	0.8	3.7	3.9	4.4	3.7	5.3	4.7	4.2	4.6	7.8	7.3	6.9	6.9	7.4	6.0	5.1
	Cholera infantum	22	57	12	3.0	3.3	3.4	3.6	3.6	3.5	3.4	4.0	4.1	3.9	4.6	4.8	4.8	4.3	3.6
	Cholera morbus	26	54	15	3.0	3.3	3.3	3.4	3.4	3.5	3.4	3.7	3.8	4.2	4.5	4.9	5.0	4.3	3.6
	Consumption, pulmonary	35	80	29	3.5	3.4	3.5	3.7	3.8	3.5	3.5	3.6	3.7	3.9	4.0	4.3	4.5	4.3	3.6
	Croup, membranous	4	39	2	4.6	4.5	4.1	4.7	4.4	4.6	4.3	5.1	6.8	6.2	6.1	7.1	7.1	6.0	5.0
	Diphtheria	10	51	5	4.4	3.5	3.4	3.5	4.4	4.2	4.3	4.8	4.4	4.2	4.7	5.1	5.4	4.7	4.1
	Diarrhea	60	69	42	2.5	2.5	2.6	2.6	2.7	2.9	2.8	3.0	3.0	3.2	3.3	3.3	3.7	3.3	2.8
	Dysentery	28	53	15	3.2	3.3	3.6	3.8	3.8	3.8	3.7	3.8	4.3	4.5	5.0	5.0	5.2	4.6	3.8
	Erysipelas	28	45	13	3.7	3.8	3.9	4.1	4.2	4.1	4.1	4.4	4.7	4.5	4.6	5.2	5.5	5.0	4.2
	Fever, intermittent	35	61	22	2.9	2.9	2.9	3.0	3.2	2.9	2.6	2.6	2.8	2.6	2.4	2.5	2.3	2.6	2.8
	Fever, remittent	32	62	20	3.1	3.1	2.9	2.9	3.3	3.2	3.2	3.1	3.4	3.3	3.2	3.3	3.3	3.2	3.2
	Fever, typhoid (enteric)	21	62	13	3.4	3.6	3.2	3.6	3.5	3.8	3.9	4.2	4.5	4.7	4.7	5.2	5.1	4.9	3.9
	Fever, typho-malarial	8	46	4	3.2	3.7	3.6	3.7	3.6	3.6	3.9	3.6	4.1	4.2	4.4	4.6	4.8	4.4	3.8

For the Year	Whole number of Average number of Whole number of Average number of Total number of Average number of	Influenza	58	77	44	2.0	2.2	2.0	2.1	2.0	2.2	2.4	2.7	3.0	2.7	2.9	3.3	3.2	2.8	2.4
		Kidney, inflammation of	33	60	20	3.6	3.7	3.7	3.6	3.9	4.1	4.1	4.5	4.9	4.7	4.4	5.0	------	4.2	4.1
		Measles	8	50	4	3.1	2.8	2.8	3.3	3.0	3.0	3.5	3.2	3.6	5.0	6.4	5.2	3.7	4.1	3.4
		Neuralgia	74	76	56	2.5	2.5	2.5	2.5	2.8	2.7	2.6	2.7	2.8	2.8	2.8	3.3	3.3	3.1	2.7
		Pleuritis	32	51	17	3.8	3.8	3.8	4.0	4.1	4.2	4.0	4.4	------	------	------	------	------	4.0	4.0
		Pneumonia	36	56	21	3.7	3.7	3.6	3.7	4.0	3.9	3.7	4.0	4.3	4.0	4.4	4.5	4.7	4.3	3.9
		Puerperal fever	7	33	2	3.5	3.9	3.8	4.1	4.5	4.5	3.4	4.6	5.7	5.9	6.3	6.9	7.3	5.7	4.5
		Rheumatism	78	76	60	2.7	2.6	2.6	2.7	2.9	2.9	2.8	3.0	3.2	3.2	3.2	3.6	3.7	3.5	2.9
		Scarlatina	19	60	12	3.5	3.3	3.6	3.2	4.2	4.2	3.9	4.6	5.0	4.5	5.0	5.2	5.2	4.8	4.1
		Small-pox	0.5	54	0.3	2.8	4.1	4.8	5.0	0	6.5	11.0	15.3	26.0	25.9	8.4	26.0	14.0	10.7	11.0
		Tonsillitis	66	64	43	3.0	3.0	2.8	2.9	3.3	3.4	3.3	3.4	3.4	3.4	3.5	3.7	3.9	3.6	3.2
		Whooping-cough	14	65	9	2.6	2.9	3.0	3.0	2.9	3.2	3.3	3.9	4.2	3.7	4.1	4.5	5.2	4.2	3.3

* For counties in each Division, see Exhibit I.

† For number of Observers, reports, weeks in each month, etc., see Exhibit III.; for names of observers, and number of reports received from each, see Exhibit V.

a Not every one of the observers sent in a report for every week, so that the number of reports received does not equal the number of observers multiplied by the number of weeks.

b The numbers in this column (pages 98-101) state not what per cent of the whole number of observers for the year reported the disease present at some time during the year, but the average (for the twelve months) of the per cents (of observers making reports for the several months) by which the disease was reported present in those months. The column for the year is thus a statement for an average *month*. But on pages 100 and 101 the numbers in the "Per Cent of Observers" column are statements for the month, and not averages. This column indicates the Area of Prevalence except that in a few instances there were two or more observers in one city or village.

c This column states for the year or given month, what per cent the number of reports which stated a disease to be present is of the number of card-reports received, for the given time, from such of the observers as reported the diseases present. It is therefore an average, not for all localities represented, but only for those at which the given disease was reported present. In the line "Average for Tabulated Diseases" it states what per cent the number of times *all* diseases were reported present is of the number of times they *might have been* so reported on the cards received, for the time specified, from the observers who during that time reported the diseases present (that is, if each of the observers had on every card he sent reported every disease present which he reported present at all). It will be seen that this is a more accurate average than would be obtained by dividing the sum of the column by the number of diseases reported present.

d This column states what per cent the number of reports stating presence of a disease is of the whole number of reports received for the time specified, from *all observers* in the State or Division, as the case may be. It combines, and states in a general way, an idea of the *time* a disease was prevalent, with an idea of the area of its prevalence. Had every observer sent a report every week of the month or year, the numbers in this column would be (for the State) the product of the numbers in the same line in the two preceding columns.

e The disease having the greatest number of cases was to be marked 1 in the order; the disease having the next greatest number of cases, 2; and so on. Diseases not present were to be marked 0. The numbers in this column are found by dividing the totals (for the State) of the Order of Prevalence column, in Table 3 (a table giving statements for each locality, omitted in printing this Report, for want of room), by the number of men who reported the disease present. The column is, therefore, an average, not for all the localities represented, but only for those at which the given disease was reported present. The numbers in the "Average" lines for this column are found by dividing the sum of the totals in the Order of Prevalence columns, in Table 3, for all diseases reported present, by the sum of the numbers of men who reported the different diseases present, thus counting each man once for every disease he reported present. As a rule, small numbers in this column indicate a large prevalence of the disease, and *vice versa;* but the greater the number of diseases reported present by each observer from week to week, the greater will be the "average" in this column.

TABLE 2.—CONTINUED.—*Diseases in the State, 1895.* (*For foot-notes and full tabular heads, see pages 98–99.*)

Months †	Diseases.	Per cent of Observers Reporting Presence of, b	Average per cent of Weeks reported Present where Present, a, c	Per cent of Reports stating Presence of, d	Average Order of Prevalence where Present, e	Months.†	Per cent of Observers Reporting Presence of, b	Average per cent of Weeks reported Present where Present, a, c	Per cent of Reports stating Presence of, d	Average Order of Prevalence where Present, e	Months.†	Per cent of Observers Reporting Presence of, b	Average per cent of Weeks reported Present where Present, a, c	Per cent of Reports stating Presence of, d	Average Order of Prevalence where Present, e	Months.†	Per cent of Observers Reporting Presence of, b	Average per cent of Weeks reported Present where Present, a, c	Per cent of Reports stating Presence of, d	Average Order of Prevalence where Present, e	Months.†	Per cent of Observers Reporting Presence of, b	Average per cent of weeks reported Present where Present, a, c	Per cent of Reports stating Presence of, d	Average Order of Prevalence where Present, e	Months.†	Per cent of Observers Reporting Presence of, b	Average per cent of Weeks reported Present where Present, a, c	Per cent of Reports stating Presence of, d	Average Order of Prevalence where Present, e
January.†	Av. for Tab. Dis. Rep. Pres.	31	64	20	3.1	February.†	30	69	21	3.3	March.†	31	71	22	3.5	April.†	31	70	22	3.4	May.†	31	59	19	2.8	June.†	29	63	18	2.7
	Brain, inflammation of	6	32	2	4.5		8	46	4	4.0		8	35	3	4.9		8	45	3	4.8		9	31	3	2.9		7	41	3	2.6
	Bowels, inflammation of	18	31	6	3.8		21	46	10	4.0		21	39	9	4.8		26	52	13	4.0		27	37	10	3.0		26	43	11	3.2
	Bronchitis	81	81	66	2.2		83	85	71	2.4		81	85	70	2.7		84	78	66	2.6		79	70	56	2.4		68	69	47	2.6
	Cerebro-spinal meningitis	3	25	1	2.7		1	50	1	1.0		4	40	2	5.5		4	50	2	4.7		4	23	1	4.0		0	0	0	0
	Cholera infantum	4	39	2	2.0		5	31	1	2.2		5	26	1	4.2		3	63	2	6.0		15	30	5	3.7		26	51	13	3.4
	Cholera morbus	12	38	5	4.2		10	58	6	4.3		7	36	3	4.4		10	42	4	4.4		15	48	7	4.4		34	48	17	2.7
	Consumption, pulmonary	38	82	33	3.7		35	85	31	4.3		39	83	33	4.3		40	84	34	3.6		43	67	29	2.9		39	77	30	3.0
	Croup, membranous	6	38	2	3.3		6	38	3	4.0		5	44	2	4.8		11	36	5	5.4		1	40	1	7.0		2	25	1	3.5
	Diphtheria	18	57	10	4.6		10	58	6	5.1		11	44	5	4.8		6	65	4	5.0		4	20	1	7.0		7	58	4	4.1
	Diarrhea	39	58	23	3.5		48	57	28	4.0		49	59	29	4.0		54	63	33	3.6		52	56	30	2.8		64	68	44	2.4
	Dysentery	11	39	5	4.7		12	52	7	4.9		13	33	4	4.3		15	33	5	3.5		17	31	5	3.4		19	46	9	3.3
	Erysipelas	25	33	8	4.0		22	50	11	3.9		25	43	11	5.1		34	55	19	4.7		36	48	17	3.3		40	47	19	3.2
	Fever, intermittent	28	59	17	3.2		19	64	13	3.8		24	64	16	3.4		33	57	19	3.8		41	52	22	3.1		43	63	27	2.4
	Fever, remittent	27	61	17	3.5		24	62	15	4.3		21	72	15	4.3		20	63	13	3.7		33	53	18	3.0		34	68	23	2.8
	Fever, typhoid (enteric)	13	55	8	4.1		10	53	5	5.3		7	59	5	4.9		11	62	8	4.6		8	38	3	3.8		6	58	3	3.2
	Fever, typho-malarial	5	36	2	5.8		6	55	3	4.5		4	54	2	5.0		6	41	3	4.2		3	50	1	2.5		1	50	0.3	2.0
	Influenza	77	86	67	1.7		87	84	74	1.4		91	92	84	1.3		90	88	80	1.5		76	66	50	2.1		40	68	27	2.7
	Kidney, inflammation of	35	49	17	3.6		37	64	25	4.2		38	62	24	4.2		34	71	24	4.3		43	55	24	3.2		32	63	20	3.3
	Measles	9	33	3	4.2		8	50	4	2.9		12	50	5	3.0		9	60	6	3.1		13	50	7	2.4		14	58	8	2.9
	Neuralgia	77	75	58	2.6		81	77	63	2.8		84	80	69	3.0		80	82	65	2.9		81	78	63	2.1		77	75	57	2.0
	Pleuritis	46	51	25	4.2		42	51	22	4.4		44	59	27	4.6		36	53	19	4.1		33	48	16	3.7		30	44	14	3.3
	Pneumonia	64	60	39	3.3		63	67	42	3.9		63	70	45	4.0		58	61	35	4.0		41	44	19	3.5		19	43	8	3.8
	Puerperal fever	12	30	4	3.5		10	39	4	3.6		7	29	2	3.3		8	35	3	4.2		9	22	2	4.0		6	41	3	2.0
	Rheumatism	78	76	60	3.0		79	82	64	2.8		83	83	69	3.3		81	83	69	3.0		85	77	66	2.4		77	75	58	2.3
	Scarlet fever	34	53	18	3.7		18	57	10	3.8		23	62	14	3.9		21	68	16	3.9		27	53	13	3.3		18	64	11	2.7
	Small-pox	1	80	1	2.0		1	100	1	1.0		2	38	1	2.5		0	0	0	0		0	0	0	0		0	0	0	0
	Tonsillitis	77	70	54	2.9		76	71	54	3.1		73	74	55	3.4		74	75	55	3.4		65	69	45	2.8		62	62	38	2.7
	Whooping-cough	23	65	15	2.5		17	64	11	2.9		13	76	9	2.9		14	62	9	3.5		12	63	8	2.8		15	57	9	2.0

	July.†				August †				September †				October.†				November.†				December.†			
Av. for Tab. Dis. Rep. Pres.	33	58	19	2.8	30	67	20	3.0	31	63	19	2.9	32	58	19	2.7	26	67	17	2.7	26	69	18	3.0
Brain, inflammation of	10	27	3	3.9	13	38	5	4.5	7	37	3	4.7	13	35	4	3.8	6	35	2	4.5	6	41	2	2.4
Bowels, inflammation of	31	33	10	3.3	28	60	16	3.5	35	45	16	3.9	29	42	13	3.0	21	47	10	3.1	16	48	8	3.4
Bronchitis	54	63	34	3.0	51	65	34	3.2	54	63	35	3.2	68	63	44	2.5	64	81	52	2.3	66	80	52	2.4
Cerebro-spinal meningitis	3	42	1	3.3	3	33	1	4.0	3	45	1	4.3	2	25	0.5	2.5	2	25	1	2.5	1	25	0.3	2.0
Cholera infantum	48	56	27	2.8	53	70	37	2.7	60	68	40	2.9	26	48	13	3.5	3	33	1	3.0	0	0	0	0
Cholera morbus	56	55	30	2.7	53	69	37	2.8	56	66	38	2.8	34	41	14	2.8	10	35	4	3.0	9	44	4	3.8
Consumption, pulmonary	38	76	29	3.3	34	82	28	3.7	30	81	25	3.6	29	84	25	3.0	28	85	24	3.2	30	80	24	3.3
Croup, membranous	2	60	1	4.0	2	50	1	6.0	3	27	1	4.0	3	25	0.7	4.7	2	43	1	2.0	5	44	2	7.0
Diphtheria	9	45	4	3.8	10	51	5	4.9	10	43	4	3.1	14	44	6	3.0	9	65	6	4.6	8	61	5	5.7
Diarrhea	82	78	64	1.8	86	85	73	1.5	87	83	71	1.7	73	68	50	2.1	40	52	21	2.9	38	62	24	3.3
Dysentery	52	53	27	3.1	61	68	42	2.8	57	65	38	2.8	49	49	25	2.9	13	43	6	3.7	8	32	2	3.3
Erysipelas	34	39	13	3.5	26	47	12	3.5	19	38	7	2.9	25	39	10	3.8	24	46	12	3.3	34	60	21	3.6
Fever, intermittent	45	65	30	2.5	42	65	27	2.9	45	57	26	2.6	39	58	23	2.6	31	61	20	2.8	28	64	19	3.2
Fever, remittent	45	54	25	3.0	30	68	20	3.2	35	66	24	2.8	42	65	28	2.3	35	58	21	2.4	34	62	22	3.2
Fever, typhoid (enteric)	23	54	13	3.1	28	71	19	3.4	36	66	23	3.2	49	62	31	2.7	32	71	24	3.1	20	68	14	4.0
Fever, typho-malarial	15	31	5	2.9	8	57	5	3.0	13	43	5	2.3	17	61	10	2.5	7	50	4	3.3	5	29	1	2.5
Influenza	37	52	19	2.8	28	63	17	2.9	26	55	14	3.4	42	61	26	2.5	53	78	41	2.0	60	84	50	2.0
Kidney, inflammation of	29	58	17	3.5	24	69	17	3.8	30	54	16	3.0	35	50	18	2.9	31	69	21	3.1	33	63	21	3.4
Measles	9	41	4	3.3	4	54	2	2.3	3	75	2	5.3	1	20	0.2	1.0	4	62	2	2.5	6	50	3	2.8
Neuralgia	71	72	51	2.4	67	74	49	2.5	66	69	45	2.7	74	71	53	2.4	68	75	52	2.3	69	82	56	2.5
Pleuritis	33	41	13	3.1	20	48	9	3.4	20	44	9	3.6	27	39	11	2.8	23	74	17	3.3	31	60	19	4.0
Pneumonia	23	36	8	3.2	11	45	5	4.2	9	45	4	4.6	23	36	9	3.2	34	52	18	3.3	38	57	22	3.7
Puerperal fever	4	83	1	5.3	2	29	1	6.5	4	29	1	4.5	5	33	2	2.4	7	36	3	2.7	7	36	2	2.7
Rheumatism	76	69	53	2.5	74	71	53	2.9	76	70	53	2.8	80	73	60	2.4	77	81	61	2.2	74	81	60	2.5
Scarlet fever	11	41	5	4.0	13	44	6	3.8	12	63	8	3.5	17	72	13	2.9	21	71	16	3.0	18	71	13	3.1
Small-pox	0	0	0	0	0	0	0	0	1	25	0.3	7.0	1	40	0.5	2.0	0	0	0	0	0	0	0	0
Tonsillitis	67	48	32	3.1	54	57	31	3.3	47	56	26	3.4	67	53	36	2.6	62	72	45	2.7	76	70	53	2.5
Whooping-cough	14	79	12	2.2	13	68	9	2.5	15	56	9	2.3	7	52	4	3.1	9	57	5	3.3	11	69	8	2.0

[Foot-notes from page 95.]

†The numbers opposite the names of the diseases do not state what per cent of the whole number of observers for the year reported the disease present at some time during the year, but state (on an average for the 12 months of the year) by what per cent of the observers making reports for the several months, the disease was reported present in those months. The column for each year is thus a statement for an average month of that year. On the two following pages of this table, however, the columns for each month state what per cent of the observers for that month (the number of whom is stated at the foot of the column) reported the given disease in that month.

[Foot-note from pages 89, 90, 91 and 95.]

‡Consumption, remittent fever, and typho-malarial fever were not printed on the first blanks used in making weekly reports (begining with the month of September, 1876); neuralgia and tonsillitis were not printed on any blanks used prior to October, 1878, and not on all used for several months after that date; inflammation of brain and inflammation of bowels were not printed on any blanks used prior to July, 1879, and not on all used for several months after that date; inflammation of kidney was not printed on any of the cards used prior to October, 1883, and not on all used for several months after that date; pleuritis was not printed on any cards used prior to 1888; hence it is probable that the diseases were not so fully reported at first as were the other diseases.

TABLE 2.—CONTINUED.—*Diseases in the Upper Peninsular, the Northwestern, the Northern, and the Northeastern Divisions of the State for the years 1877–1894, also for the years 1886–1894, for the year and by Months in 1895.—Indicating what Per Cent of the Weekly Reports Received Stated the Presence of the Diseases Named.*[d]

Division.*	Diseases.	1877–1894.‡	1886–1894.	1895.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Division.*	1877–1894.‡	1886–1894.	1895.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for Tab. Dis. Rep. Pres.	27	24	27	28	30	31	35	25	25	21	31	17	4	4	15		29	25	23	25	25	25	23	26	23	21	21	21	24	24	24
Upper Peninsular Division.*	Brain, inflammation of	7	7	8	3	0	17	24	13	0	0	7	0	0	0	0	Northwestern Division.*	5	6	0.8	0	0	0	0	0	0	0	0	0	8	0	0
	Bowels, inflammation of	16	13	18	9	32	17	40	13	0	12	29	13	0	0	0		13	16	0	0	0	0	0	0	0	0	0	0	0	0	0
	Bronchitis	70	68	78	89	89	93	88	69	80	53	93	25	0	0	50		61	62	71	93	90	100	90	90	71	29	25	30	69	100	80
	Cerebro-spi. meningitis	3	3	2	0	0	3	8	0	0	0	0	0	0	0	0		2	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cholera infantum	15	16	11	11	4	3	20	6	20	18	21	25	0	0	0		20	17	22	0	0	0	0	0	14	50	75	70	46	0	0
	Cholera morbus	20	22	11	9	7	3	0	13	0	29	50	25	0	0	0		20	17	15	0	0	0	0	0	29	29	63	50	23	0	0
	Consumption, pulmonary	60	45	45	46	54	47	48	31	60	29	71	25	0	0	50		43	48	53	57	40	50	40	80	57	57	50	40	38	67	60
	Croup, membranous	5	5	5	0	14	0	20	0	0	0	0	0	0	0	0		5	3	0.8	0	0	0	0	0	0	0	0	0	0	0	10
	Diphtheria	10	12	11	17	7	3	16	6	20	12	29	0	0	0	0		11	6	10	14	10	0	0	0	0	7	0	0	0	44	40
	Diarrhea	60	60	62	57	57	53	52	56	70	100	100	75	25	0	25		51	44	60	43	60	50	50	60	86	71	100	100	54	44	20
	Dysentery	23	19	22	17	14	10	16	31	30	41	79	0	0	0	0		26	23	16	29	40	13	0	0	0	43	0	20	23	0	0
	Erysipelas	21	17	13	9	18	17	24	6	10	24	0	13	0	0	0		28	20	15	21	20	25	30	10	14	0	0	20	8	0	30
	Fever, intermittent	7.1	5.5	1	3	0	0	4	0	0	0	0	0	0	0	0		54	34	41	29	40	50	40	60	57	36	50	50	46	33	20
	Fever, remittent	9.8	3.9	0.5	0	4	0	0	0	0	0	0	0	0	0	0		33	30	15	0	0	0	0	20	43	36	13	20	31	0	10
	Fever, typhoid (enteric)	29	29	22	17	18	17	48	19	0	0	36	38	100	0	0		10	11	19	29	30	0	0	0	0	14	38	40	38	33	0
	Fever, typho-malarial	4	3	2	3	4	0	8	0	0	0	0	0	0	0	0		19	10	5	0	0	0	0	0	0	0	0	0	31	22	0
	Influenza	41	32	69	83	82	90	96	63	70	24	43	13	0	0	50		42	38	70	100	90	100	100	100	71	36	13	20	38	78	100
	Kidney, inflammation of	30	23	41	23	50	47	52	43	60	24	57	38	0	0	50		24	19	5	0	30	0	0	0	0	0	0	0	8	11	10
	Measles	15	12	1	0	0	7	0	0	0	0	0	0	0	0	0		12	9	3	29	0	0	0	0	0	0	0	0	0	0	0
	Neuralgia	56	57	70	69	75	83	84	56	70	53	64	75	0	67	50		66	60	60	64	40	88	70	80	43	64	38	40	77	44	60
	Pleuritis	21	16	31	54	39	47	32	25	30	12	0	0	0	0	0		22	17	11	14	20	25	20	0	0	7	0	0	0	22	30
	Pneumonia	35	29	37	43	43	57	60	31	20	12	21	0	0	0	0		39	40	34	50	40	38	70	50	14	21	13	0	15	56	40
	Puerperal fever	6	6	5	3	11	3	4	6	0	0	7	0	0	0	25		5.1	5	2	0	10	0	10	0	0	0	0	0	0	0	0
	Rheumatism	61	56	64	63	64	73	76	81	70	53	71	25	0	0	50		66	60	68	64	50	75	60	100	71	64	88	50	69	56	80
	Scarlet fever	23	16	31	26	29	43	44	56	20	29	14	0	0	0	25		16	9	5	14	0	0	0	20	0	0	0	20	0	0	0
	Small-pox	0.3	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0		0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tonsillitis	51	55	69	80	79	77	92	50	70	41	79	25	25	0	50		54	51	51	36	80	100	60	60	71	21	25	10	38	67	80
	Whooping-cough	21	17	40	63	54	53	36	25	10	29	0	50	25	33	0		14	7	2	14	0	0	10	0	0	0	0	0	0	0	0

	Av. for Tab. Dis. Rep. Pres.	20	20	17	18	17	13	22	18	16	15	18	12	15	18	18		26	24	24	28	28	25	30	30	24	16	17	18	20	33	34
Northern Division.*	Brain, inflammation of	10	13	4	0	0	0	5	7	5	0	11	0	12	0	5	Northeastern Division.*	3	3	1	0	0	0	0	0	0	0	13	0	0	0	0
	Bowels, inflammation of	9	12	16	11	27	0	16	21	32	11	22	13	18	0	11		19	17	32	0	38	13	25	20	50	10	38	38	33	100	100
	Bronchitis	51	50	71	83	93	67	84	86	68	47	44	38	59	73	95		69	64	81	100	100	100	100	100	83	50	50	63	67	100	100
	Cerebro-spi. meningitis	4.2	4.9	0	0	0	0	0	0	0	0	0	0	0	0	0		1.7	1.1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cholera infantum	7	9	11	6	0	0	0	7	14	21	39	50	0	0	0		8	7	4	0	0	0	0	0	0	10	0	25	0	0	0
	Cholera morbus	8	9	9	0	0	0	5	0	5	37	22	38	0	7	0		9	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	Consumption, pulmonary	34	43	6	0	0	8	32	10	14	0	6	0	0	0	0		42	33	1	0	0	0	0	0	0	10	0	0	0	0	0
	Croup, membranous	2	3	0.9	0	13	0	0	0	0	0	0	0	0	0	0		4	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diphtheria	7	5	7	22	20	33	16	0	0	0	0	6	0	0	0		10	11	5	30	13	0	0	0	0	0	0	0	0	0	0
	Diarrhea	26	20	26	6	20	8	37	14	36	32	67	38	35	13	11		50	43	61	60	50	38	100	100	83	40	88	50	44	50	75
	Dysentery	15	12	12	0	0	0	5	0	9	37	61	6	12	7	5		16	12	10	0	0	13	0	0	0	10	13	25	33	0	0
	Erysipelas	23	30	15	6	0	0	5	14	18	16	22	6	18	27	42		25	25	33	20	38	0	75	40	67	20	0	25	44	50	100
	Fever, intermittent	26	25	17	11	0	0	11	31	23	11	39	25	24	20	0		34	39	1	0	0	13	0	0	0	0	0	0	0	0	0
	Fever, remittent	10	13	16	0	13	0	5	21	18	5	17	6	71	27	11		10	4	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fever, typhoid (enteric)	9	9	6	0	0	0	11	7	5	0	11	0	0	20	16		2.2	1.6	0	0	0	0	0	0	0	0	0	0	0	0	0
	Fever, typho-malarial	7	5	0	0	0	0	0	0	0	0	0	0	0	0	0		6	4	1	0	0	0	0	0	0	0	13	0	0	0	0
	Influenza	33	32	40	61	87	92	95	45	9	16	6	0	6	40	47		50	56	79	100	100	100	100	100	67	50	50	50	67	100	100
	Kidney, inflammation of	17	19	26	28	13	25	32	28	32	21	11	19	18	40	37		36	33	63	50	50	50	100	100	83	50	50	50	56	100	100
	Measles	7	4	2	0	0	0	0	10	9	0	0	0	0	0	0		8	7	0	0	0	0	0	0	0	0	0	0	0	0	0
	Neuralgia	50	44	47	56	53	50	63	62	45	26	44	19	41	53	42		69	63	74	70	75	88	100	100	67	60	63	63	56	100	100
	Pleuritis	22	17	17	44	13	8	32	24	14	16	6	0	6	20	11		15	12	56	50	50	38	75	100	50	50	50	50	33	100	100
	Pneumonia	20	19	25	61	47	17	32	34	9	21	6	0	0	27	42		26	22	29	70	88	50	0	40	17	0	0	0	11	50	0
	Puerperal fever	6	4	1	0	0	0	0	7	5	0	0	0	0	0	0		3	2	1	0	13	0	0	0	0	0	0	0	0	0	0
	Rheumatism	58	55	52	56	47	42	58	48	41	58	39	38	65	80	53		67	61	79	100	88	88	100	100	83	60	50	63	56	100	100
	Scarlet fever	5	5	2	0	0	0	21	3	0	0	0	0	0	0	0		7	6	13	40	38	50	0	0	0	0	0	0	0	0	0
	Small-pox	0.2	0.3	0	0	0	0	0	0	0	0	0	0	0	0	0		.08	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tonsillitis	33	36	29	28	33	0	47	38	32	26	17	13	12	33	47		58	51	48	80	50	75	75	40	17	40	0	13	56	75	75
	Whooping-cough	8	7	14	22	0	0	0	0	5	21	22	25	24	20	32		7	7	0	0	0	0	0	0	0	0	0	0	0	0	0

*, †, d See page 99 ‡ Inflammation of kidney was not compiled until 1884. For inflammation of brain and inflammation of bowels, an average for the 15 years, 1880-1894; for neuralgia and tonsillitis, an average for the 16 years, 1879-94; pleuritis was not compiled until 1888; for other diseases and for the average line, an average for the 18 years, 1877-1894. For the Northern Division, 1882-94. For the Northeastern Division, 1883-94.

TABLE 2.—CONTINUED.—*Diseases in the Western, Northern Central, Bay and Eastern, and the Central Divisions of the State, for the Years, 1877-1894, also for the Years 1886-1894, for the Year and by Months in 1895, indicating what Per Cent of the Weekly Reports Received Stated the Presence of the Diseases Named.*[d]

Division.*	Diseases.	1877-1894.‡	1886-1894.	1895.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.	Divison.*	1877-1894.‡	1886-1894.	1895.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for Tab. Dis. Rep. Pres.	28	25	19	23	21	21	21	17	20	19	16	16	16	19	19		24	20	18	33	36	29	19	11	15	15	17	17	19	17	19
Western Division.*	Brain, inflammation of	4	4	7	6	15	5	0	5	20	11	11	0	7	0	9	Northern Central Division.*	2	2	3	0	0	0	0	0	0	0	4	4	9	5	0
	Bowels, inflammation of	16	15	15	11	13	8	17	9	7	25	28	24	23	11	9		5	4	11	0	0	17	0	8	10	7	15	13	23	11	0
	Bronchitis	52	50	36	60	59	51	44	14	27	29	0	14	20	47	26		49	45	42	100	100	67	80	8	33	30	8	25	59	68	75
	Cerebro-spi. meningitis	3.6	3.3	3	0	5	8	6	5	0	4	11	0	0	5	0		5	1.6	1	0	0	0	20	0	0	0	0	0	5	0	0
	Cholera infantum	13	10	6	4	5	3	0	5	13	11	17	24	0	0	0		11	12	22	0	0	17	0	0	19	30	54	50	9	0	0
	Cholera morbus	18	14	6	6	5	5	0	0	7	14	11	17	3	0	0		14	12	14	0	0	0	0	0	19	27	31	21	9	0	0
	Consumption, pulmonary	45	40	26	26	18	16	44	55	47	25	33	21	17	16	22		34	31	16	20	100	83	20	0	19	17	19	0	9	5	13
	Croup, membranous	6	5	3	11	0	3	11	0	0	0	0	3	0	11	0		6	2	0	0	0	0	0	0	0	0	0	0	0	0	0
	Diphtheria	19	9	2	2	0	3	0	0	7	4	0	3	7	0	4		17	5	3	0	0	17	0	0	10	3	4	0	0	0	0
	Diarrhea	46	45	32	30	28	30	6	5	47	43	50	45	37	32	30		42	37	49	40	0	50	80	50	57	60	81	83	36	0	0
	Dysentery	22	16	14	2	13	11	11	5	20	21	22	28	23	16	0		15	13	26	0	0	0	20	17	24	33	54	46	23	11	0
	Erysipelas	25	20	14	9	5	8	11	18	27	25	17	10	17	16	26		24	19	6	0	0	17	0	25	5	7	4	0	0	11	6
	Fever, intermittent	62	49	26	36	18	14	50	23	27	32	11	38	27	11	26		57	48	41	40	0	0	20	8	43	63	58	21	41	42	56
	Fever, remittent	52	37	34	28	28	32	33	59	40	36	39	17	37	53	35		44	33	22	40	0	0	0	0	24	23	4	17	36	37	50
	Fever, typhoid (enteric)	9	7	9	6	3	0	0	5	13	11	11	21	33	5	0		8	7	26	0	75	50	0	0	10	23	35	42	27	21	31
	Fever, typho-malarial	19	12	3	0	3	3	11	0	7	7	0	7	7	0	0		18	9	9	0	0	0	20	0	0	17	19	21	5	0	0
	Influenza	46	45	49	72	72	76	78	55	40	29	0	10	23	47	48		17	20	22	100	100	100	100	50	10	3	8	0	18	16	25
	Kidney, inflammation of	18	18	42	40	51	38	44	36	33	36	56	31	40	68	39		9	10	5	60	50	0	0	8	0	0	0	4	5	5	6
	Measles	6	10	5	0	3	3	0	0	7	4	17	7	3	16	17		12	9	3	20	0	0	0	0	0	3	0	0	0	11	6
	Neuralgia	69	68	56	72	62	76	78	59	53	43	39	34	30	47	57		53	50	46	80	100	100	40	50	24	20	19	46	73	63	69
	Pleuritis	20	16	13	28	28	24	11	5	0	7	11	3	0	5	4		5	4	15	100	100	33	0	0	5	7	8	8	14	21	19
	Pneumonia	34	28	28	45	51	51	17	27	0	29	17	7	10	11	13		28	25	10	80	100	50	40	0	0	7	0	4	0	0	19
	Puerperal fever	6	5	2	4	3	0	0	0	0	4	0	0	3	0	4		6	6	5	0	0	0	0	0	5	0	4	4	14	11	13
	Rheumatism	63	64	64	60	54	84	78	73	60	43	50	66	50	79	78		57	56	52	60	100	83	80	42	62	20	27	38	77	68	75
	Scarlet fever	18	10	3	15	5	0	0	0	7	4	0	0	0	0	0		10	10	5	0	0	0	0	17	19	7	0	4	5	0	0
	Small-pox	0.6	0.2	0	0	0	0	0	0	0	0	0	0	0	0	0		0.6	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tonsillitis	51	49	28	43	41	24	22	27	20	14	6	14	23	26	57		50	43	33	80	75	67	0	25	14	17	19	13	45	63	69
	Whooping-cough	13	10	10	17	8	11	11	0	20	14	0	3	0	16	17		12	9	7	100	100	50	0	0	0	0	4	0	0	0	0

	Av. for Tab. Dis. Rep. Pres.	29	24	17	16	17	16	17	18	18	18	17	17	16	16	15		25	23	20	18	18	22	22	21	19	22	22	21	20	16	16
Bay and Eastern Division.*	Brain, inflammation of	5	4	1	1	0	0	0	2	2	0	0	0	3	0	5	Central Division.*	4	4	3	2	3	0	4	3	8	3	2	1	2	2	0
	Bowels, inflammation of	20	18	6	6	5	4	6	12	9	2	2	7	5	7	7		14	15	12	5	9	15	19	10	17	12	16	13	10	14	7
	Bronchitis	65	58	40	61	62	60	44	50	42	16	19	20	32	36	38		54	55	54	69	77	75	68	70	46	37	41	40	50	53	48
	Cerebro-spi. meningitis	5	3	0.2	0	0	0	0	0	0	2	0	0	0	0	0		3.6	3.1	1	1	0	2	0	2	0	0	1	5	1	1	1
	Cholera infantum	16	15	11	0	0	0	0	7	23	19	34	38	13	0	0		10	8	13	0	2	2	0	3	4	31	41	39	16	1	0
	Cholera morbus	19	17	14	0	2	2	6	2	12	30	53	44	12	0	7		14	14	13	0	8	2	2	0	14	29	32	32	16	2	1
	Consumption, pulmonary	62	52	35	41	34	31	35	33	40	43	36	31	27	39	26		52	43	32	33	31	37	34	50	47	38	29	32	21	17	25
	Croup, membranous	8	4	1	1	0	0	0	0	2	0	0	0	2	0	7		3	3	0.7	1	0	0	0	0	0	2	1	1	0	0	2
	Diphtheria	21	11	10	20	9	4	0	0	12	17	11	11	11	5	10		14	5	3	4	2	6	0	2	3	0	7	3	3	0	2
	Diarrhea	47	42	33	12	12	23	29	21	42	63	74	67	33	20	0		43	43	49	28	37	35	32	32	45	72	77	88	70	22	17
	Dysentery	17	14	14	1	2	0	3	7	16	37	38	27	20	7	0		14	14	16	4	6	2	2	7	5	21	43	45	28	6	5
	Erysipelas	22	17	8	4	0	10	12	29	12	8	2	7	6	2	14		19	19	12	4	6	17	23	23	18	11	13	5	7	14	19
	Fever, intermittent	57	33	9	3	0	0	9	12	16	17	21	11	5	5	10		58	42	20	12	15	21	23	20	29	34	17	24	20	13	11
	Fever, remittent	35	22	15	3	10	8	6	12	30	27	19	18	15	11	17		40	32	21	12	12	15	21	15	19	35	23	24	28	13	21
	Fever, typhoid (enteric)	11	12	22	3	0	6	6	7	5	21	30	42	62	50	21		12	12	14	9	3	2	0	0	5	13	21	22	27	26	15
	Fever, typho-malarial	23	15	2	0	0	0	0	0	0	5	2	4	6	0	0		14	8	5	1	2	0	0	0	0	4	10	5	18	6	4
	Influenza	41	39	39	68	74	85	85	40	7	2	2	2	24	39	45		39	41	39	49	57	77	77	55	36	31	21	13	26	35	38
	Kidney, inflammation of	18	16	7	6	5	0	6	17	9	5	6	11	6	7	10		21	21	20	14	17	31	23	28	19	24	15	15	21	23	22
	Measles	13	10	7	7	5	10	15	12	16	10	0	7	0	0	2		9	8	3	4	0	4	4	0	8	10	4	0	0	0	0
	Neuralgia	67	62	49	51	57	63	53	60	53	43	36	29	47	50	43		65	68	62	68	68	75	66	78	69	61	61	45	59	53	59
	Pleuritis	21	16	14	20	22	17	9	17	19	11	4	7	11	16	14		15	12	15	14	11	29	15	23	10	9	12	11	14	17	23
	Pneumonia	35	26	15	23	34	19	18	21	5	5	0	7	9	14	21		29	24	18	25	35	50	45	23	17	7	7	4	9	10	17
	Puerperal fever	4	4	1	4	2	6	3	0	2	0	0	0	0	0	0		4.5	3.8	1	4	2	0	6	2	0	4	0	0	1	1	0
	Rheumatism	71	65	53	41	55	46	62	64	53	60	60	42	44	64	52		0.6	66	63	62	68	77	70	80	64	64	56	62	63	55	53
	Scarlet-fever	15	11	14	17	12	13	18	12	14	6	4	9	27	18	12		11	8	14	15	5	10	26	10	13	5	7	18	18	27	16
	Small-pox	0.7	.03	0	0	0	0	0	0	0	0	0	0	0	0	0		0.3	0.1	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tonsillitis	48	42	40	43	59	40	47	50	37	37	26	36	33	41	38		42	43	44	53	40	65	60	57	37	32	41	32	40	44	48
	Whooping-cough	20	13	8	12	14	4	9	7	12	10	6	4	2	9	10		14	10	7	1	2	0	0	2	8	19	17	12	6	3	4

*, †, d. See page 99. ‡ Inflammation of kidney was not compiled until 1884. For inflammation of brain and inflammation of bowels, an average for the 15 years, 1880 94; for neuralgia and tonsillitis, an average for the 16 years, 1879-94; pleuritis was not compiled until 1888; for other diseases, and for the average line, an average for the 18 years, 1877 94.

TABLE 2.—CONTINUED.—*Diseases in the Southwestern and Southern Central Divisions of the State, for the years 1877-94; also for the years 1886-94, for the Year and by Months in 1895.—Indicating what Per Cent of the Weekly Reports Received stated the Presence of the Diseases named.*[d]

Division.*	Diseases.	1877-1894.‡	1886-1894.	1895.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for Tab. Dis. Rep. Pres.	27	24	25	27	29	28	26	19	18	26	25	25	25	25	23
Southwestern Division.*	Brain, inflammation of	3	3	6	0	12	0	0	3	0	6	10	10	13	15	3
	Bowels, inflammation of	11	12	14	3	0	4	11	9	10	19	39	16	28	19	10
	Bronchitis	54	55	52	79	76	79	58	58	39	29	26	48	38	52	55
	Cerebro-spi. meningitis	1.6	1.3	2	3	0	0	0	3	0	10	3	0	0	0	0
	Cholera infantum	18	15	22	0	0	0	0	15	19	48	61	81	23	4	0
	Cholera morbus	16	17	23	3	0	0	0	6	26	55	61	71	31	11	3
	Consumption, pulmonary	63	53	23	26	36	32	37	15	3	19	13	19	31	22	34
	Croup, membranous	4	4	7	8	8	18	16	6	3	13	10	0	5	4	0
	Diphtheria	9	4	2	0	0	0	0	0	0	0	0	6	10	4	0
	Diarrhea	38	37	40	5	8	21	26	21	29	71	87	84	67	15	24
	Dysentery	15	16	21	0	4	0	5	0	10	48	68	61	38	0	0
	Erysipelas	22	22	26	26	48	29	42	9	29	45	32	10	10	15	34
	Fever, intermittent	64	44	39	37	36	39	26	24	29	42	39	48	49	56	38
	Fever, remittent	42	31	44	58	44	36	42	30	32	45	42	52	46	59	38
	Fever, typhoid (enteric)	6	5	10	0	4	0	0	0	0	10	19	6	28	30	24
	Fever, typho-malarial	18	15	4	3	4	4	0	0	0	6	0	3	13	7	0
	Influenza	44	44	62	82	92	96	95	70	39	35	42	39	46	59	69
	Kidney, inflammation of	16	17	14	13	28	11	16	9	13	10	13	3	18	19	17
	Measles	10	10	8	3	16	11	16	27	16	0	3	0	0	4	10
	Neuralgia	69	64	64	79	96	79	79	67	61	68	35	45	49	63	59
	Pleuritis	17	14	23	34	40	57	32	3	19	23	6	10	10	26	31
	Pneumonia	29	28	33	87	80	89	47	15	6	10	0	0	10	33	31
	Puerperal fever	3	4	2	3	4	0	0	0	0	0	0	0	5	15	0
	Rheumatism	76	77	75	92	100	96	89	79	48	65	52	58	72	85	79
	Scarlet fever	11	9	14	29	8	0	11	15	19	3	3	0	18	30	21
	Small-pox	0.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Tonsillitis	45	46	51	74	64	68	79	39	42	42	39	19	41	56	62
	Whooping-cough	14	13	5	16	12	7	11	0	0	0	3	3	3	4	0

Division.*	Diseases.	1877-1894.‡	1886-1894.	1895.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for Tab. Dis. Rep. Pres.	27	25	21	22	21	23	23	20	20	19	21	23	21	18	20
Southern Central Division.*	Brain, inflammation of	4	4	3	2	1	6	0	2	0	3	5	4	3	1	2
	Bowels, inflammation of	14	13	8	4	4	8	5	3	4	8	15	24	10	8	5
	Bronchitis	62	58	55	57	63	69	69	52	56	46	47	43	52	54	53
	Cerebro-spi. meningitis	3	1.6	0.2	1	0	1	0	0	0	0	0	0	0	0	0
	Cholera infantum	10	10	10	0	0	1	0	2	15	25	25	32	15	0	0
	Cholera morbus	18	16	22	13	16	6	11	29	31	32	33	44	20	7	13
	Consumption, pulmonary	55	46	33	42	37	43	36	24	22	32	33	32	39	31	23
	Croup, membranous	3	2	0.8	0	1	1	5	0	0	0	0	1	0	0	2
	Diphtheria	11	7	7	11	10	4	4	2	3	2	4	7	15	15	10
	Diarrhea	47	47	45	25	32	19	29	37	46	67	77	75	56	27	45
	Dysentery	18	19	13	7	5	4	2	5	6	15	33	42	25	6	3
	Erysipelas	17	16	12	8	5	7	20	14	24	9	12	8	15	13	18
	Fever, intermittent	61	41	32	23	19	28	25	41	37	37	40	39	35	30	26
	Fever, remittent	45	35	23	23	19	17	13	27	25	23	25	33	30	14	18
	Fever, typhoid (enteric)	8	7	10	10	5	6	9	0	0	16	7	19	19	14	10
	Fever, typho-malarial	14	9	4	7	11	7	4	0	0	7	3	4	1	0	0
	Influenza	42	48	45	74	73	89	71	41	25	15	23	19	28	45	47
	Kidney, inflammation of	17	16	16	13	18	25	27	21	24	16	12	18	8	7	6
	Measles	10	8	3	0	4	3	9	6	6	0	0	6	0	3	2
	Neuralgia	70	71	64	57	59	67	76	75	72	63	67	65	63	55	61
	Pleuritis	16	12	15	15	15	14	22	16	15	14	8	10	15	20	19
	Pneumonia	32	28	21	37	37	44	31	10	4	6	7	7	13	25	31
	Puerperal fever	2.8	2.3	3	7	3	3	2	5	3	1	0	3	1	1	6
	Rheumatism	72	74	63	75	75	71	75	62	63	48	59	64	63	52	52
	Scarlet fever	14	12	14	22	14	19	16	13	12	3	16	10	6	14	24
	Small-pox	0.5	0.3	0.2	0	0	1	0	0	0	0	0	1	0	0	0
	Tonsillitis	51	52	52	66	60	64	65	63	51	43	35	33	42	49	60
	Whooping-cough	15	13	9	5	5	7	11	16	12	11	11	8	5	1	13

*, †, d See page 99. ‡ Inflammation of kidney was not compiled until 1884. For inflammation of brain and inflammation of bowels, an average for the 15 years, 1880-94; for neuralgia and tonsillitis, an average for the 16 years, 1879-94; pleuritis was not compiled until 1888; for other diseases and for the average line, an average for the 18 years, 1877-94.

TABLE 2.—CONCLUDED.—*Diseases in the Southeastern Division of the State, for the Years 1877–94, also for the years 1886–94, for the Year and by Months in 1895 —Indicating what per cent of the Weekly Reports Received stated the Presence of the Diseases named.*[d]

Division *	Diseases.	1877–1894.‡	1886–1894.	1895.†	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
	Av. for Tab. Dis. Rep. Pres.	29	23	13	10	16	16	11	12	12	14	14	15	14	13	16
Southeastern Division.*	Brain, inflammation of	10	6.1	1	0	2	0	0	0	0	2	5	5	0	0	0
	Bowels, inflammation of	16	12	8	7	7	8	6	12	8	9	8	14	8	0	6
	Bronchitis	64	60	40	42	60	55	52	43	33	25	23	33	40	39	47
	Cerebro-spi. meningitis	5.6	2.8	0	0	0	0	0	0	0	0	0	0	0	0	0
	Cholera infantum	13	10	9	0	2	0	0	2	8	25	38	29	0	3	0
	Cholera morbus	19	14	11	5	0	0	0	4	10	28	36	36	4	3	0
	Consumption, pulmonary	69	56	18	14	14	18	16	16	18	13	15	19	25	26	25
	Croup, membranous	9	5	0.2	0	0	3	0	0	0	0	0	0	0	0	0
	Diphtheria	22	11	3	7	7	3	6	0	0	4	3	0	0	6	0
	Diarrhea	47	41	30	0	12	33	26	24	28	58	38	45	29	16	38
	Dysentery	21	15	11	0	5	5	6	0	0	23	33	36	19	0	3
	Erysipelas	29	23	8	2	21	3	6	12	13	8	10	2	4	3	9
	Fever, intermittent	53	34	9	7	5	10	0	8	18	17	10	7	6	3	9
	Fever, remittent	34	22	11	14	7	15	6	2	13	9	5	17	13	16	19
	Fever, typhoid (enteric)	19	13	8	7	2	0	0	2	0	4	21	19	25	13	6
	Fever, typho-malarial	18	9	3	0	0	0	0	8	0	0	0	5	15	10	3
	Influenza	41	37	32	33	69	63	52	33	13	11	5	7	15	35	69
	Kidney, inflammation of	24	24	24	12	26	23	10	24	18	21	23	21	33	42	38
	Measles	14	10	2	0	5	8	0	6	3	0	0	0	0	0	0
	Neuralgia	54	50	34	5	45	40	26	31	30	38	41	38	42	26	17
	Pleuritis	13	10	13	16	17	30	6	12	13	21	13	7	6	0	6
	Pneumonia	34	23	11	23	26	33	23	4	0	0	0	0	4	13	9
	Puerperal fever	8	5	2	2	5	3	0	0	10	0	0	2	0	3	0
	Rheumatism	70	66	43	19	38	48	45	43	45	42	41	36	58	52	59
	Scarlet fever	21	13	7	12	2	15	0	16	5	0	0	0	10	10	6
	Small-pox	2.5	0.9	2	9	10	5	0	0	0	0	0	0	4	0	0
	Tonsillitis	46	44	29	28	45	45	23	18	30	25	15	24	25	32	47
	Whooping-cough	21	12	7	12	2	0	0	16	18	9	8	10	0	0	6

*, †, d See page 99. ‡ Inflammation of kidney was not compiled until 1884. For inflammation of brain and inflammation of bowels, an average for the 15 years, 1880-94; for neuralgia and tonsillitis an average for the 16 years, 1879-94; pleuritis was not compiled until 1888; for other diseases and for the average line an average for the 18 years, 1877-94.

TABLE 4.—*A Summary for the Year 1895, relative to Diseases in each of the Eleven Divisions of the State,—indicating the prevalence as regards both Time and Area.*

Diseases.	Upper Peninsular Division.*				Northwestern Division.*				Northern Division.*				Northeastern Division.*				Western Division.*			
	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e
Av. for Tab. Dis. Reported Present.	38	70	27	4.0	33	69	23	3.9	29	59	17	2.6	32	74	24	3.0	32	58	19	2.5
Brain, inflammation of	19	41	8	5.0	3	33	0.8	2.0	12	36	4	3.3	5	25	1	4.0	15	44	7	2.5
Bowels, inflammation of	33	58	18	5.1	0	0	0	0	39	43	16	2.7	55	57	32	4.1	36	39	15	2.3
Bronchitis	87	88	78	2.8	85	83	71	3.0	89	78	71	2.0	90	91	81	2.7	61	58	36	2.5
Cerebro-spinal meningitis	4	38	2	6.0	0	0	0	0	0	0	0	0	0	0	0	0	8	42	3	3.6
Cholera infantum	24	47	11	4.6	27	71	22	3.0	21	54	11	2.5	10	33	4	1.5	15	40	6	2.2
Cholera morbus	20	51	11	5.1	27	48	15	3.2	14	67	9	2.3	0	0	0	0	15	40	6	1.9
Consumption, pulmonary	59	77	45	4.0	55	94	53	5.9	16	44	6	2.7	5	20	1	1.0	31	77	26	2.7
Croup, membranous	11	38	5	6.7	3	25	0.8	8.0	4	25	0.9	2.5	0	0	0	0	10	37	3	3.1
Diphtheria	20	45	11	5.5	15	60	10	6.0	9	75	7	2.2	10	44	5	3.5	10	23	2	2.3
Diarrhea	72	84	62	3.2	79	73	60	3.6	46	60	26	2.8	80	76	61	3.1	54	58	32	2.3
Dysentery	30	68	22	5.0	24	65	16	4.5	28	43	12	2.6	25	36	10	3.2	36	37	14	2.6
Erysipelas	28	42	13	5.8	42	36	15	4.9	33	48	15	3.1	60	53	33	3.7	33	42	14	2.7
Fever, intermittent	4	22	1	5.0	48	81	41	3.4	39	46	17	2.7	5	25	1	5.0	51	50	26	2.0
Fever, remittent	2	25	0.5	4.0	21	60	15	3.3	33	47	16	2.4	0	0	0	0	56	59	34	2.6
Fever, typhoid (enteric)	33	61	22	3.6	27	63	19	5.1	12	59	6	3.6	0	0	0	0	21	43	9	3.1
Fever, typho-malarial	6	31	2	5.3	6	67	5	5.5	0	0	0	0	5	25	1	4.0	12	29	3	1.6
Influenza	80	87	69	2.4	82	83	70	2.0	56	72	40	2.1	80	96	79	1.4	63	78	49	1.7
Kidney, inflammation of	59	72	41	5.0	15	46	5	4.6	49	50	26	3.0	65	98	63	3.6	52	79	42	2.8
Measles	4	29	1	4.5	3	100	3	8.0	4	83	2	3.0	0	0	0	0	11	50	5	2.2
Neuralgia	85	82	70	3.6	76	75	60	3.7	74	65	47	2.4	90	79	74	2.1	75	75	56	2.3
Pleuritis	44	62	31	5.6	24	45	11	5.6	33	51	17	3.2	70	77	56	3.9	25	51	13	3.0
Pneumonia	54	63	37	5.2	61	55	34	4.6	42	59	25	3.1	50	55	29	3.9	43	62	28	2.9
Puerperal fever	13	33	5	6.1	6	50	2	2.5	5	23	1	3.7	5	25	1	4.0	7	23	2	2.5
Rheumatism	83	76	64	3.9	88	76	68	4.1	75	67	52	2.7	90	87	79	2.3	83	77	64	2.5
Scarlet fever	48	58	31	4.8	12	38	5	5.5	5	42	2	3.3	15	85	13	2.7	10	37	3	3.0
Small-pox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Tonsillitis	80	86	69	3.2	79	64	51	3.7	51	59	29	2.4	70	66	48	4.1	51	53	28	2.9
Whooping-cough	51	70	40	2.8	6	43	2	1.5	18	73	14	2.1	0	0	0	0	18	58	10	2.4

* For counties in each division see Exhibit 1.

b, c, d, e. See foot-notes with these marks in Table 2.

TABLE 4.—CONCLUDED.

Diseases.	Northern Central Division.*				Bay and Eastern Division.*				Central Division.*				Southwestern Div.*				Southern Central Division.*				Southeastern Div.*			
	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e	Per Cent of Observers Reporting Presence of. b	Av. Per Cent of Weeks Reported Present where Present. c	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence where Present. e
Av. for Tab. Dis. Rep. Present	29	60	18	2.7	25	64	17	2.8	31	63	20	2.8	36	68	25	3.3	30	68	21	3.3	24	58	13	2.5
Brain, inflammation of	8	33	3	3.0	3	39	1	3.0	7	35	3	3.6	17	35	6	4.9	8	30	3	4.9	3	40	1	4.3
Bowels, inflammation of	27	41	11	3.1	15	36	6	3.3	27	45	12	3.7	25	59	14	3.8	24	33	8	4.1	20	41	8	3.2
Bronchitis	59	69	42	2.8	54	72	40	2.6	71	75	54	2.4	71	73	52	3.1	71	77	55	2.9	64	64	40	2.1
Cerebro-spinal meningitis	4	40	1	2.0	0.6	25	0.2	5.0	4	29	1	3.8	4	35	2	3.5	0.9	33	0.2	3.0	0	0	0	0
Cholera infantum.	35	63	22	2.5	18	60	11	2.7	24	59	13	2.8	36	63	22	3.0	17	56	10	3.9	18	52	9	2.7
Cholera morbus	27	56	14	2.1	26	52	14	2.7	27	49	13	2.8	41	57	23	3.4	34	62	22	3.6	21	52	11	2.4
Consumption, pulmonary	27	61	16	4.2	41	83	35	3.6	37	84	32	2.8	29	77	23	3.9	38	85	33	3.8	25	70	18	2.9
Croup, membranous	0	0	0	0	3	38	1	4.0	2	33	0.7	3.6	13	51	7	5.4	3	29	0.8	4.8	0.8	33	0.2	3.0
Diphtheria	8	33	3	2.3	13	71	10	4.4	6	44	3	4.2	6	28	2	2.7	13	56	7	6.2	6	47	3	2.1
Diarrhea	71	70	49	1.7	49	66	33	2.1	70	69	49	2.3	59	68	40	2.7	61	73	45	3.0	48	63	30	2.2
Dysentery	45	57	26	2.3	23	55	14	3.1	34	48	16	3.1	29	69	21	3.4	21	59	13	3.8	24	48	11	2.6
Erysipelas	20	30	6	2.3	19	43	8	2.7	26	49	12	3.7	58	44	26	4.2	24	50	12	4.2	18	44	8	3.1
Fever, intermittent	59	68	41	2.7	20	43	9	2.8	35	56	20	3.3	49	77	39	3.0	43	70	32	3.1	19	43	9	2.5
Fever, remittent	31	66	22	2.7	24	60	15	2.7	33	68	21	3.0	56	75	44	3.8	33	66	23	3.6	23	47	11	2.4
Fever, typhoid (enteric)	39	63	26	3.1	30	71	22	3.3	22	62	14	3.2	15	67	10	2.6	15	64	10	4.6	14	56	8	2.4
Fever, typho-malarial	20	43	9	2.9	4	33	2	2.0	9	54	5	2.6	11	33	4	3.4	6	61	4	5.6	7	55	3	2.0
Influenza	31	75	22	2.1	50	76	39	1.7	55	70	39	2.1	75	82	62	2.2	56	80	45	1.9	49	67	32	1.6
Kidney, inflammation of	14	36	5	3.6	12	55	7	3.3	40	50	20	3.6	25	53	14	4.8	27	57	16	3.4	39	63	24	3.1
Measles	8	28	3	5.0	13	51	7	2.9	7	39	3	3.1	14	61	8	3.1	6	54	3	3.0	4	45	2	2.4
Neuralgia	67	69	46	2.2	65	73	49	2.6	82	76	62	2.5	77	83	64	2.8	80	81	64	2.3	54	65	34	2.4
Pleuritis	29	47	15	3.5	26	51	14	3.9	33	46	15	3.2	41	56	23	4.9	30	48	15	3.8	30	43	13	3.1
Pneumonia	14	70	10	3.7	28	51	15	3.1	36	48	18	3.4	47	68	33	4.1	38	55	21	4.0	22	50	11	2.7
Puerperal fever	14	36	5	3.6	6	25	1	2.8	4	33	1	2.7	5	38	2	3.6	8	35	3	3.9	6	42	2	2.6
Rheumatism	73	70	52	2.9	73	71	53	2.6	80	79	63	2.5	92	82	75	2.7	80	79	63	2.6	61	71	43	2.3
Scarlet fever	14	36	5	2.4	20	68	14	3.5	23	61	14	2.5	20	64	14	2.7	22	64	14	4.5	12	55	7	2.4
Small-pox	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0.9	25	0.2	4.5	3	67	2	2.0
Tonsillitis	61	53	33	2.9	62	63	40	3.0	68	65	44	2.9	75	67	51	3.2	74	71	52	3.0	58	51	29	2.7
Whooping-cough	8	81	7	1.8	14	60	8	2.3	10	68	7	2.4	9	47	5	3.8	12	68	9	3.5	12	59	7	1.5

* For counties in each division see Exhibit 1. b, c, d, e. See foot-notes with these marks in Table 2.

DISEASES IN MICHIGAN, ARRANGED IN ORDER OF PREVALENCE, THOSE WHICH CAUSE MOST SICKNESS FIRST.

EXHIBIT A.—*Order of Prevalence of twenty-eight diseases in Michigan, in the period of twelve years, 1883–1894, and in each of those years, also in 1895; and the average for the twelve years, 1883–1894, judging from the "Per Cent of Reports," which stated the presence of each of the diseases, in connection with the reported "Order of Prevalence" when and where each disease was present. (The method of rating diseases for this Exhibit is described and illustrated in a "Compiling Table" on pages 122 and 123 of the Annual Report for 1890.)*

Order, 1883–94.	Diseases arranged in order of greatest prevalence.	Average Order, 1883–94.	1895.	1894.	1893.	1892.	1891.	1890.	1889.	1888.	1887.	1886.	1885.	1884.	1883.
1	Rheumatism	2	3	1	1	2	2	1	1	1	1	1	3	2	4
2	Neuralgia	2	1	2	2	1	3	2	2	2	2	2	1	1	2
3	Bronchitis	3	4	3	4	3	4	3	3	3	3	3	4	4	3
4	Fever, intermittent	5	7	8	7	7	8	8	5	4	5	4	2	3	1
5	Diarrhea	6	5	5	6	5	5	5	4	6	6	7	7	6	6
6	Consumption, pul.	6	10	7	8	9	7	6	6	5	4	5	5	5	5
7	Influenza	6	2	4	3	4	1	4	8	8	8	8	8	9	8
8	Tonsillitis	6	6	6	5	6	6	7	7	7	7	6	6	7	7
9	Fever, remittent	9	9	9	9	8	9	9	9	9	9	9	9	8	9
(10)	(The Average Disease)	10	8	9	10	9	10	9	10	11	11	10	10	10	11
10	Pneumonia	11	16	16	12	11	13	10	10	10	10	10	10	10	10
11	Whooping-cough	13	8	10	11	10	10	13	11	20	19	12	13	13	19
12	Cholera morbus	14	11	12	13	14	12	12	15	15	12	14	15	15	15
13	Kidney, inflam. of*	14	14	17	16	12	14	15	14	16	15	13	12	11	-------
14	Erysipelas	15	23	21	21	21	19	15	12	11	11	11	11	12	12
15	Dysentery	15	13	13	17	17	17	14	13	13	13	15	19	14	13
16	Measles	16	18	11	10	16	11	11	22	12	16	22	25	23	11
17	Cholera infantum	17	12	15	15	15	15	17	18	18	18	17	18	18	17
18	Fever, typho-mal.	18	20	23	22	22	20	19	17	14	14	16	14	17	14
19	Pleuritis*	19	21	22	20	19	18	18	16	17	-----	-----	-----	-----	-------
20	Scarlet fever	19	19	14	19	13	22	22	21	22	22	20	20	19	16
21	Fever, typhoid (ent.)	20	17	18	14	20	16	20	20	21	21	21	21	22	21
22	Bowels, inflam. of	20	22	20	23	23	21	21	19	19	17	18	17	21	20
23	Diphtheria	20	27	19	18	18	23	23	24	23	20	19	16	20	18
24	Puerperal fever	23	24	24	24	26	25	24	23	24	23	24	24	16	24
25	Brain, inflam. of	25	26	28	26	25	26	27	27	27	24	23	22	24	22
26	Croup,	25	28	27	25	27	24	25	26	26	25	25	23	26	23
27	Cerebro-spi. men.	26	25	25	27	24	27	26	25	25	26	26	26	25	25
28	Small-pox	27	15	26	28	28	28	28	28	28	27	27	27	27	26

*Inflammation of kidney was not compiled until 1884, pleuritis was not compiled until 1888.

DISEASES WHICH CAUSE MOST SICKNESS IN MICHIGAN.

This is shown in this Report in Exhibit A, and more specifically in Exhibit VI., in this Report, and in similar exhibits in previous Reports. The question is differently answered in different years. For many years after the compilation of weekly reports was begun, intermittent fever appeared to be the leading cause of sickness in Michigan.

By exhibit A, one may see that in the year 1883 intermittent fever, in the years 1884–5 neuralgia, in the years 1886–90 rheumatism, in 1891 influenza, in 1892 neuralgia, in 1893–94 rheumatism, and in 1895 neuralgia appeared to have caused most sickness in Michigan. This does not necessarily imply that there was an increase in rheumatism or neuralgia, because one disease *may* exhibit a higher relative order of prevalence on account of some other disease or diseases having been actually lessened in prevalence.

The "Average Disease" of those reported, is included in Exhibit A, as a standard by which to judge the fluctuations. It may be seen that in 1890, the "Average Disease" was higher (9) by one-tenth, than the average (10) of a long series of years; in 1891 it was lowered to the average; in 1892 it was again higher by one-tenth than the average; in 1893 it was again lowered to the average; in 1894 it was again one-tenth higher, and in 1895 it was two-tenths higher.

In this connection it should be stated that the average number of diseases reported on each card has gradually decreased for the past twelve years. This is shown in Exhibit B, as follows:—

EXHIBIT B.—*Stating for each of the twelve years, 1884–1895, the number of card reports received, the total number of disease reports and the average number of diseases reported on each card; also the averages for the 11 years, 1884–1894.*

Year.	Number of card reports received.	Number of disease reports.	Av. number of diseases on each card.
1884	3,957	31,466	7.91
1885	5,108	35,752	7.00
1886	5,583	38,640	6.92
1887	4,896	33,048	6.75
1888	5,047	33,270	6.59
1889	5,000	32,612	6.52
1890	4,939	33,934	6.87
1891	4,291	28,741	6.70
1892	5,281	31,269	5.92
1893	5,853	32,723	5.59
1894	5,572	30,619	5.50
Av. for the 11 years, 1884–1894	5,048	32,916	6.57
1895	4,394	24,004	5.46

In 1890 rheumatism, neuralgia, bronchitis and influenza in order named headed the list. In 1891 influenza, rheumatism, neuralgia and bronchitis headed the list. In 1892 neuralgia, rheumatism, bronchitis and influenza headed the list. In 1893 rheumatism, neuralgia, influenza and bronchitis, in 1894 rheumatism, neuralgia, bronchitis and influenza and in 1895 neuralgia, influenza, rheumatism and bronchitis in order named, appear to have caused most sickness in Michigan.

Nearly the same diseases appear above the average line each year. Pneumonia has appeared tenth in order for eleven years in succession, ending with 1890, and dropped to thirteenth in 1891, rising in 1892 to eleventh and dropped in 1893 to twelfth and in 1894–1895 to sixteenth in order. Some of the diseases of minor importance vary considerably in their order. Whooping-cough, for example, in 1883 was nineteenth in order, and rose to twelfth in order in 1886, dropped to nineteenth in 1887, to twentieth in 1888, and rose to eleventh in 1889, dropped to thirteenth in 1890, and rose to tenth in 1891 and 1892, dropped to eleventh in 1893 and rose to tenth in 1894 and eighth in 1895.

Exhibit VII. supplies data relative to what diseases caused most sickness in 1895 in each of the several geographical divisions of Michigan. It may be seen that there is evidence that there are very great differences in the different parts of the State. Further evidence is very desirable, however, in order to reach conclusions on this important subject. The exhibit will be found of great interest to those who study it carefully, and in connection with previous reports.

The lines for 1895 in Exhibit XIII., are graphically represented in Diagrams 1, 2, 3 and 4 of this article.

EXHIBIT VI.—*Diseases from which there seems to have been the Most Sickness in Michigan in 1895, as indicated by the Per Cent of Weekly Reports Stating Presence of the Diseases, as studied in connection with the Average Order of Prevalence of said Diseases when Reported Present; also Order, Per Cent of Reports and Average Order for the same Diseases in 1894, 1893, 1892, and 1891.*

1895.					1894			1893.			1892.			1891.		
Order.*		Diseases in Order of Apparent Amount of Sickness in 1895. Most Prevalent Disease First.	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence when Present. e	Order.*	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence when Present. e	Order.*	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence when Present. e	Order.*	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence when Present. e	Order.*	Per Cent of Reports Stating Presence of. d	Av. Order of Prevalence when Present. e
More sickness than Av. for 28 Diseases.	1	Neuralgia	56	2.5	2	56	2.5	2	57	2.5	1	61	2.5	3	66	2.8
	2	Influenza	44	2.0	4	41	2.2	3	43	2.0	4	42	2.1	1	55	2.0
	3	Rheumatism	60	2.7	1	62	2.6	1	64	2.6	2	64	2.7	2	69	2.9
	4	Bronchitis	52	2.6	3	50	2.6	4	53	2.5	3	54	2.6	4	60	2.7
	5	Diarrhea	42	2.5	5	40	2.5	6	40	2.6	5	43	2.6	5	47	2.7
	6	Tonsillitis	43	3.0	6	42	3.0	5	49	2.8	6	48	2.9	6	49	3.3
	7	Fever, intermittent	22	2.9	8	24	2.9	7	24	2.9	7	27	3.0	8	36	3.2
	(8)	Average	20	3.0	(9)	20	3.0	(10)	20	3.3	(9)	21	3.1	(10)	25	3.3
Less than said Average.	8	Whooping-cough	9	2.6	10	12	2.9	11	9	3.0	10	10	3.0	10	9	2.9
	9	Fever, remittent	20	3.1	9	20	3.1	9	18	2.9	8	21	2.9	9	28	3.3
	10	Consumption, pul.	29	3.5	7	36	3.4	8	38	3.5	9	38	3.7	7	49	3.8
	11	Cholera morbus	15	3.0	12	14	3.3	13	14	3.3	14	15	3.4	12	16	3.4
	12	Cholera infantum	12	3.0	15	12	3.3	15	10	3.4	15	11	3.6	15	13	3.6
	13	Dysentery	15	3.2	13	14	3.3	17	13	3.6	17	15	3.8	17	16	3.8
	14	Kidney, inflam. of	20	3.6	17	17	3.7	16	17	3.7	12	21	3.6	14	20	3.9
	15	Small-pox	0.3	2.8	26	0.6	4.1	28	0.3	4.8	28	.02	5.0	0	0	0

* Judging from the per cent of reports which stated presence of the diseases in connection with the order of prevalence when present. The method of rating diseases, as causes of sickness, as shown in Exhibits VI. and VII., is fully described and illustrated by a "Compiling table" on pages 122 and 123 of the Annual Report for the year 1890.

d This column states what per cent the number of reports stating presence of a disease is of the whole number of reports received for the time specified, from *all observers* in the State. It combines and states in a general way, an idea of the *time* a disease was prevalent, with an idea of the area of its prevalence.

e The disease having the greatest number of cases was to be marked 1, in the order; the disease having the next greatest number of cases, 2; and so on. Diseases not present were to be marked 0. The numbers in this column are found by dividing the totals of the Order of Prevalence columns in Table 3 (omitted in this report), by the number of men who reported the disease present. The column is, therefore, an average, not for all the localties represented, but only for those at which the given disease was reported present. The numbers in the "Average" lines for this column are found by dividing the sum of the totals in the Order of Prevalence columns, in Table 3, for all diseases reported present, by the sum of the numbers of men who reported the different diseases present, thus counting each man once for every disease he reported present. As a rule, small numbers in this column indicate the large prevalence of the disease, and *vice versa*; but the greater the number of diseases reported present by each observer, from week to week, the greater will be the average in this column.

EXHIBIT VII.—*In each of Eleven Geographical Divisions* of the State, the Fifteen Diseases from which there seems to have been the Greatest Amount of sickness in 18 5, as indicated by the Per Cent of Weekly Reports Stating Presence of each of 28 Leading Diseases, when Studied in connection with the Average Order of Prevalence of said diseases when reported present.*

	Order.†	Diseases in Order of Apparent Amount of Sickness. Most Prevalent Disease First.	Per Cent of Reports stating Presence.[d]	Av Order of Prevalence when Pres.[e]	Diseases in Order of Apparent Amount of Sickness. Most Prevalent Disease First.	Per Cent of Reports stating Presence.[d]	Av. Order of Prevalence when Pres.[e]	Diseases in Order of Apparent Amount of Sickness. Most Prevalent Disease First.	Per Cent of Reports stating Presence.[d]	Av. Order of Prevalence when Pres.[e]
		UPPER PEN'LAR DIV.*			NORTHWESTERN DIV *			NORTHERN DIVISION.*		
More Sickness than Av. for 28 Diseases.	1	Bronchitis	78	2.8	Influenza	70	2.0	Bronchitis	71	2.0
	2	Influenza	69	2.4	Bronchitis	71	3.0	Influenza	40	2.1
	3	Tonsillitis	69	3.2	Rheumatism	68	4.1	Neuralgia	47	2.4
	4	Neuralgia	70	3.6	Diarrhea	60	3.6	Rheumatism	52	2.7
	5	Diarrhea	62	3.2	Neuralgia	60	3.7	Tonsillitis	29	2.4
	6	Rheumatism	64	3.9	Tonsillitis	51	3.7	Whooping-cough	14	2.1
	7	Whooping-cough	40	2.8	Fever, intermittent	41	3.4	Fever, remittent	16	2.4
	8	Consumption, pul.	45	4.0	Cholera infantum	22	3.0	Diphtheria	7	2.2
	9	Fev., typhoid (ent.)	22	3 6	Consumption, pul.	53	5.9	Cholera morbus	9	2.3
	(10)	Average	27	4.0		----	----		----	----
Less than said Average.	10	Kidney, inflam. of	41	5 0	Whooping-cough	2	1.5	Diarrhea	26	2.8
	(11)		----	----		----	----	Average	17	2.6
	11	Scarlet fever	31	4.8	Pneumonia	34	4.6	Cholera infantum	11	2.5
	(12)		----	----	Average	23	3.9		----	----
	12	Pneumonia	37	5.2	Cholera morbus	15	3.2	Fever, intermittent	17	2.7
	13	Dysentery	22	5.0	Fever, remittent	15	3.3	Dysentery	12	2.6
	14	Pleuritis	31	5.6	Brain, inflam. of	0 8	2.0	Bowels, inflam. of	16	2.7
	15	Fever, remittent	0.5	4 0	Puerperal fever	2	2.5	Kidney, inflam. of	26	3.0
		NORTHERN CEN. DIV *			WESTERN DIVISION.*			NORTHEASTERN DIV.*		
More Sickness than Av. for 28 Diseases in 1895.	1	Diarrhea	49	1.7	Influenza	49	1.7	Influenza	79	1.4
	2	Neuralgia	46	2.2	Rheumatism	64	2.5	Rheumatism	79	2.3
	3	Rheumatism	52	2.9	Neuralgia	56	2.3	Neuralgia	74	2.1
	4	Fever, intermittent	41	2.7	Fever, intermittent	26	2.0	Bronchitis	81	2.7
	5	Bronchitis	42	2.8	Diarrhea	32	2.3	Diarrhea	61	3.1
	6	Dysentery	26	2.3	Bronchitis	36	2.5	Kidney, inflam. of	63	3.6
	7	Influenza	22	2.1	Kidney, inflam. of	42	2.8	Consumption, pul.	1	1.0
	8	Tonsillitis	33	2.9	Fever, remittent	34	2.6	Pleuritis	56	3.9
	9	Cholera infantum	22	2.5	Fever, typho-mal.	3	1.6	Cholera infantum	4	1.5
	10	Cholera morbus	14	2.1	Cholera morbus	6	1.9	Tonsillitis	48	4.1
	(11)		---	---		----	----	Average	24	3.0
Less than said Average.	11	Fever, remittent	22	2.7	Bowels, inflam. of	15	2 3	Erysipelas	33	3.7
	12	Whooping-cough	7	1.8	Consumption, pul.	26	2.7	Scarlet fever	13	2.7
	(13)		----	----	Average	19	2.5		----	----
	13	Fev., typhoid (ent.)	26	3.1	Pneumonia	28	2.9	Pneumonia	29	3.9
	(14)	Average	18	2.7		----	----		----	----
	14	Erysipelas	6	2.3	Tonsillitis	28	2.9	Bowels, inflam. of	32	4.1
	15	Cerebro-spi. men.	1	2.0	Cholera infantum	6	2.2	Dysentery	10	3.2

*, † Foot-notes with these marks on opposite page. d, e. Foot-notes with these marks are on page 99.

EXHIBIT VII.—CONTINUED.

	Order.†	Diseases in Order of Apparent Amount of Sickness. Most Prevalent. Disease First.	Per Cent of Reports stating Presence of.d	Av. Order of Prevalence when Pres.e	Diseases in Order of Apparent Amount of Sickness. Most Prevalent Disease First.	Per Cent of Reports stating Presence of.d	Av. Order of Prevalence when Pres.e	Diseases in Order of Apparent Amount of Sickness. Most Prevalent Disease First.	Per Cent of Reports stating Presence of.d	Av. Order of Prevalence when Pres.e
		BAY AND EASTERN DIV.*			CENTRAL DIVISION.*			SOUTHWESTERN DIV.*		
More Sickness than Av. for 28 Diseases.	1	Influenza	39	1.7	Rheumatism	63	2.5	Rheumatism	75	2.7
	2	Rheumatism	53	2.6	Neuralgia	62	2.5	Influenza	62	2.2
	3	Neuralgia	49	2.6	Bronchitis	54	2.4	Neuralgia	64	2.8
	4	Diarrhea	33	2.1	Diarrhea	49	2.3	Bronchitis	52	3.1
	5	Bronchitis	40	2.6	Influenza	39	2.1	Diarrhea	40	2.7
	6	Tonsillitis	40	3.0	Tonsillitis	44	2.9	Tonsillitis	51	3.2
	7	Consumption, pul.	35	3.6	Consumption, pul.	32	2.8	Fever, intermittent.	39	3.0
	(8)	Average	17	2 8	----	----	----	----	----	----
Less.	8	Fever, remittent	15	2.7	Scarlet fever	14	2.5	Fever, remittent	44	3.8
	(9)	----	----	----	Average	20	2.8	----	----	----
	9	Whooping-cough	8	2.3	Whooping-cough	7	2.4	Cholera infantum	22	3.0
	10	Cholera morbus	14	2.7	Fever, remittent	21	3.0	Scarlet fever	14	2.7
	11	Fever, typho-mal.	2	2.0	Cholera infantum	13	2 8	Fev., typhoid (ent.)	10	2.6
	(12)	----	----	----	----	----	----	Average	25	3.3
	12	Fev., typhoid (ent.)	22	3.3	Cholera morbus	13	2.8	Cholera morbus	23	3.4
	13	Cholera infantum	11	2.7	Fever, typho-mal.	5	2 6	Dysentery	21	3.4
	14	Pneumonia	15	3.1	Dysentery	16	3.1	Diphtheria	2	2.7
	15	Erysipelas	8	2.7	Fever, intermittent.	20	3 3	Pneumonia	33	4.1
		SOUTH'N CENTRAL DIV.*			SOUTHEASTERN DIVISION.*					
More Sickness than Av. for 28 Diseases.	1	Neuralgia	64	2.3	Bronchitis				40	2.1
	2	Rheumatism	63	2 6	Rheumatism				43	2.3
	3	Influenza	45	1.9	Influenza				32	1.6
	4	Bronchitis	55	2 9	Neuralgia				34	2.4
	5	Tonsillitis	52	3.0	Diarrhea				30	2.2
	6	Diarrhea	45	3 0	Tonsillitis				29	2.7
	7	Fever, intermittent.	32	3 1	Whooping-cough				7	1.5
	8	Consumption, pul.	33	3.8	Kidney, inflammation of				24	3.1
	(9)	Average	21	3 3	Average				13	2.5
Less.	9	Fever, remittent	23	3 6	Cholera morbus				11	2.4
	10	Cholera morbus	22	3.6	Fever, remittent				11	2.4
	11	Kidney, inflam. of	16	3.4	Consumption, pul.				18	2.9
	12	Pneumonia	21	4 0	Fever, typho-malarial				3	2.0
	13	Measles	3	3 0	Small-pox				2	2.0
	14	Pleuritis	15	3.8	Dysentery				11	2.6
	15	Whooping-cough	9	3.5	Fever, typhoid (ent.)				8	2.4

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* The counties in each division are stated in Exhibit I.

† Judging from the per cent of reports in connection with the "average order of prevalence where present."

d, e. Foot-notes with these marks are on page 99.

EXHIBIT VIII.—*Names of Stations where were made the Observations of Meteorological Conditions used in Exhibit X., and following Exhibits; relative to Sickness and Meteorological Conditions in 1895, also the Temperature, Humidity, Cloudiness, Ozone, Velocity of Wind and Atmospheric Pressure, at each Station for which Observations of the given condition are included in the summary statement relative to that condition in said exhibit.*

Stations.* (Those of the U S. Weather Bureau in Italics.)	Temperature.		Humidity.		Per Cent of Cloudiness.	Ozone.		Wind, Av Velocity.	Atmospheric Pressure.		
									Range.		
	Average Daily Range.	Average.	Relative.	Absolute.		Day.	Night.		Monthly.	Average Daily.	Average.
Number of Stations included in Average	17	10	8	8	9	9	9	6	9	9	9
Average	19.18	46.37	74	3.35	50	3.67	4.09	10.2	.888	.201	29.125
Rockland	21.33	------	------	------	------	5.68	6.14	------	------	------	------
Marquette	15.02	------	------	------	------	------	------	10.4	------	------	------
Sault Ste. Marie	17.08	------	------	------	------	------	------	8.3	------	------	------
Traverse City	20.10	45.15	80	3.36	54	6.49	6.62	------	.903	.204	29.310
Alpena	15.57	------	------	------	------	------	------	------	------	------	------
Harrisville	20.36	41.55	64	2.83	61	3.00	3.16	------	.942	.219	29.331
Grand Haven	15.73	------	------	------	------	------	------	10.6	------	------	------
Port Huron	16.86	------	------	------	------	------	------	11 3	------	------	------
Thornville	18.27	46.75	75	3.37	42	3.38	4.90	------	.974	.205	28.942
Agricultural College	26.93	46.67	80	3.73	51	------	------	------	.804	.190	29.060
Lansing, S. B of H.	20.39	46.74	67	3.16	54	2.48	2.70	9.8	.869	.197	29.078
Adrian	20.75	47 62	------	------	------	1.88	2.34	------	.869	.196	29.125
Ann Arbor	20.17	46.72	80	3.43	44	3.22	2.90	------	.902	.205	29.044
Battle Creek	------	48.37	------	------	49	2.26	2.50	------	------	------	------
Kalamazoo	18.44	------	------	------	------	------	------	------	------	------	------
Tecumseh	20.55	46.43	69	3.27	41	4.63	5.56	------	.836	.187	29.151
Birmingham	22.36	47.67	73	3.61	56	------	------	------	.892	.209	29.083
Detroit	16.18	------	------	------	------	------	------	10.8	------	------	------

* Observations of range of temperature were made with registering thermometers read and set at the Stations of the U. S. Weather Bureau as follows:—the maximum at the morning observation, the minimum at the evening observation, at 9 P. M. at Ann Arbor, and at 7 A M at other stations. For the ozone observations, the test-paper was exposed from 7 A. M to 2 P. M. for the day observations, and from 9 P. M. to 7 A. M. for the night observations. The velocity of wind was recorded by registering anemometers. These subjects are treated by months in 1895 and for previous years, in an article on Meteorological Conditions in Michigan in 1895, on pages 1–78 of this Report.

EXHIBIT IX.—*Showing Comparisons between the Averages of certain Meteorological Conditions at the Stations in Michigan in 1895, with those in preceding Years. (Abstracted from Exhibits 9, 13, 17, 19, 28, 24, 25, 30, 31, 32 and 35, pages 18 to 71 of this Report.)*

Meteorological Conditions.		Av.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Average Temperature	In 1895 higher than Av. for 18 years, 1877 94	.13				2.83	3.78	4.36		2.10	4.60			.67
	Lower		2.32	6.29	2.58				.70			4.95	.01	
Av. Daily Range of Temp.	In 1895 greater than Av. for 16 years, 1879-94	1.18			1.18	.79	2.27	3.64	2.55	1.53	.92	1.54	1.16	.40
	Less		.52	1.23										
Absolute Humidity	In 1895 more than Av. for 18 years, 1877-94					.11	.50	.03		.15	.47			.01
	Less	.10	.26	.38	.35				.67			.77	.08	
Relative Humidity	In 1895 more than Av. for 17 years, 1878-94						0							
	Less	2	3	5	4	1	0	7	5	1	3	4	1	1
Rainfall	In 1895 more than Av. for 18 years, 1877-94		.74							.24			.38	2.05
	Less	8.02		1.82	1.29	1.09	.59	2.51	1.54		.58	2.03		
Velocity of Wind	In 1895 more than Av. for 13 years, 1882-94	.6	1.0	.9	1.6		0	.5	.6	.5	2.0	2.3		
	Less					1.2	0						.6	.6
Cloudiness	In 1895 more than Av. for 18 years, 1877-94								11					
	Less	6	2	8	10	4	7	12		4	6	13	4	1
Day Ozone	In 1895 more than Av. for 18 years, 1877-94	.22	.54	.29	.32	.49	.49	.04		.55				.28
	Less								.13		.02	.14	.02	
Night Ozone	In 1895 more than Av. for 18 years, 1877-94	.49	.20	.34	.42	.60	.74	.55	.57	1.14	.54	.04	.01	.41
	Less													
Atmospheric Pressure	In 1895 more than Av. for 18 years, 1877 94					.005	.042	.092	.011				.054	
	Less	.012	.114	.040	.014					.062	.041	.002		.081

CLIMATE AND SICKNESS.*

Exhibit X. (and similar exhibits in previous Reports) is an attempt to learn something of the relations of bronchitis to meteorological conditions, by noting whether each meteorological condition was above or below its average for the year, in months when more or in months when less bronchitis than the average for the year was reported. The months are arranged in order according to the prevalence of bronchitis; those months in which most bronchitis was reported being placed first in the column; those in which more bronchitis that the average was reported are placed above the average line, the others below that line. The meteorological conditions for each month are printed, in the proper columns, in the line for the month. The statements being thus arranged, it is easy to see whether the temperature, the velocity of the wind, or any other condition represented, was above its annual average in months when more than the average amount of bronchitis was reported, or *vice versa.*

That the comparisons may the more readily be held in mind, propositions have been made concerning the relations of bronchitis to meteorological conditions, grouping the conditions into two classes. The letters *a* and *b* in the exhibit mark exceptions to these propositions. It is not supposed that the propositions are in every case true concerning every disease; but the propositions serve to bring out the evidence of the exhibit on the subject in question. This evidence is appreciated by noting the number and force of the exceptions to the propositions, and also whether the exception is explained by facts shown in other columns. A summary of the evidence is presented in Exhibit XXV., near the close of this article.

Exhibits and propositions similar to those relative to bronchitis, but relating to other diseases, are given on following pages. The propositions are differently stated for the summer diseases (beginning with the exhibit on diarrhea) and for the winter diseases (beginning with that on bronchitis), but they are not changed to fit the individual diseases under each class.

RELATIONS OF BRONCHITIS TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That in months when **more** than the average per cent of weekly reports stated the presence of bronchitis, the relative humidity of the atmosphere, the average per cent of cloudiness, the ozone, the average velocity of the wind, the monthly and the average daily range of the barometer, were **greater** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of bronchitis, these conditions were **less** than the average for the year. In Exhibit X., the letter *a* marks exceptions to this proposition for the year 1895.

PROPOSITION 2.—That in months when **more** than the average per cent of weekly reports stated the presence of bronchitis, the average daily temperature, the average daily range of temperature†, the absolute humidity of the atmosphere and the average daily pressure of the atmosphere† were **less** than than the average for the year; and in months when **less** than the average per cent of reports stated the presence of bronchitis these conditions were **greater** than the average for the year. In Exhibit X., the letter *b* marks exceptions to this proposition for months in 1895.

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*The remarks under this head are applicable, also, by changing the name of the diseases to diseases treated in Exhibits XII., XIV., XV., XVI. and XVII., on the following pages. The meteorological data are from places indicated in Exhibit VIII.

†The statements relative to the average daily range of temperature and the average daily pressure of the atmosphere were taken from Proposition 1 and inserted in Proposition 2 in the statistical study of sickness in Michigan in 1893. Annual Report for 1894.

Proposition 3.—For those months which are not, as regards the absolute humidity of the atmosphere, exceptions to Proposition 2, it is true also that the quantity of vapor inhaled daily was **less** than the average, and the quantity exhaled daily in excess of that inhaled was **greater** than the average in months when **more** than the average per cent of reports stated presence of bronchitis; and that **more** vapor was inhaled and a **less** excess exhaled daily in months when the per cent of reports stating presence of bronchitis was **less** than the average.

Proposition 3 also holds true in relation to pneumonia, membranous croup, diphtheria, tonsillitis, influenza, scarlet fever, rheumatism, neuralgia, pleuritis and pulmonary consumption, treated in Exhibits XII., XIV., XV., XVI. and XVII., on following pages.

What per cent of weekly reports received in 1895 stated presence of bronchitis is graphically represented by months in Diagram 1.

The evidence of Exhibit X. confirms that of similar exhibits relating to bronchitis in previous years.

What per cent of the reports received stated presence of bronchitis by months in each of the years 1877–95; also the averages for 1877–94 and 1886–94, and a comparison of 1895 with those averages, are shown in Exhibit XI.

RELATIONS OF PNEUMONIA AND OTHER "COLD WEATHER" DISEASES TO METEOROLOGICAL CONDITIONS.

Proposition 1.—That in months when **more** than the average per cent of weekly reports stated the presence of pneumonia (or of membranous croup, diphtheria, tonsillitis, influenza, scarlet fever, rheumatism, neuralgia, pleuritis, pulmonary consumption or average disease), the relative humidity of the atmosphere, the average per cent of cloudiness, the ozone, the average velocity of the wind and the monthly and the average daily range of the barometer, were **greater** than the average for the year; and in months when **less** than the average per cent of the reports stated the presence of pneumonia (or of the other diseases named), these conditions were **less** than the average for the year. In Exhibits XII.-XXVIII., the letter *a* marks exceptions to this proposition for the year 1895.

Proposition 2.—That in months when **more** than the average per cent of weekly reports stated the presence of pneumonia (or of membranous croup, diphtheria, tonsillitis, influenza, scarlet fever, rheumatism, neuralgia, pleuritis, pulmonary consumption or average disease), the average daily temperature, the average daily range of temperature*, the absolute humidity of the atmosphere, and the average daily pressure of the atmosphere*, were **less** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of pneumonia (or of the other diseases named), these conditions were **greater** than the average for the year. In Exhibits XII.-XXVIII., the letter *b* marks exceptions to this proposition for the year 1895.

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*The statements relative to the average daily range of temperature and the average daily pressure of the atmosphere were taken from Proposition 1 and inserted in Proposition 2 in the statistical study of sickness in Michigan in 1893, Annual Report for 1894.

What per cent of the weekly reports received in 1895 stated presence of pneumonia is graphically represented by months in Diagram 1. What per cent of weekly reports received stated presence of pneumonia, and of the other diseases mentioned in the two preceding propositions by months in the years 1894 and 1895, is stated in Exhibit XIII., where are also given an average for the eighteen years, 1877–1894, also for the nine years, 1886–1894, and a comparison of 1895 with those averages.

From Exhibit XIII., it may be seen that pneumonia was considerably less in 1895 than the average for eighteen years, 1877–1894, and also less in each month of 1895, than for the corresponding months of the eighteen years, 1877–1894.

The average temperature was slightly higher in 1895, than the average for the eighteen years, 1877–1894. In 1895, it was also higher in the months of April, May, June, August, September, and December; and lower in the months of January, February, March, July, October, and November.

The absolute humidity was slightly less in 1895, than the average for the eighteen years, 1877–1894. In 1895, it was more in the months of April, May, June, August, September, and December; and less in the months of January, February, March, July, October, and November, than the average in the corresponding months in the eighteen years, 1877–1894.

The relative humidity was less for the year and each month of the year 1895, except May (being the same), than the average for the seventeen years, 1878–1894.

EXHIBIT XI.—SICKNESS FROM BRONCHITIS, 1877-95.—*By Year and Months for each of the eighteen Years, 1877-94, and for 1895, and an average for the eighteen years, 1877-94, also for the nine years, 1886-1894; Stating on what per cent of the Weekly Reports received Bronchitis was reported present, and comparing the Per Cents of 1895, with the Averages for corresponding months in those Years.*

Years, etc.	Annual Av.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Average 18 years, 1877-94	59	73	74	73	69	60	51	42	40	47	54	64	68
Average 9 years, 1886-94	57	69	70	69	67	59	48	41	39	46	54	60	65
1877	55	76	72	72	65	45	31	25	22	37	48	71	77
1878	64	77	75	74	71	65	56	41	45	55	60	73	81
1879	64	83	87	83	78	65	54	40	41	50	59	65	77
1880	64	81	84	82	68	59	57	44	45	46	57	67	72
1881	62	86	86	80	78	62	53	38	37	44	44	66	68
1882	65	73	70	75	74	70	62	51	44	57	59	71	71
1883	66	77	80	82	76	70	62	56	53	53	57	61	69
1884	61	71	71	71	65	59	56	49	47	50	56	69	70
1885	56	73	74	76	73	56	52	44	39	45	51	58	64
1886	56	71	69	71	65	57	45	40	37	41	51	61	65
1887	55	67	69	67	62	57	49	41	38	47	57	57	61
1888	59	63	76	74	68	63	55	41	39	49	59	59	65
1889	58	65	68	69	68	61	50	49	44	51	57	64	62
1890	65	71	74	76	74	66	56	50	52	54	65	73	79
1891	60	81	79	81	76	64	48	43	36	44	48	57	68
1892	54	72	70	64	67	56	47	37	38	42	50	57	63
1893	53	67	67	62	64	54	42	35	34	39	48	61	62
1894	50	63	60	61	58	49	42	32	36	43	52	53	57
1895	52	66	71	70	66	56	47	34	34	35	44	52	52
In 1895 Less than Average 1877-94	7	7	3	3	3	4	4	8	6	12	10	12	16
In 1895 Greater than Average 1886-94*	-	----	1	1	----	----	----	----	----	----	---	----	----
In 1895 Less than Average 1886-94*	5	3	----	--	1	3	1	7	5	11	10	8	13

* This comparison is made because of change of plan of reports in May, 1885, as explained on page 80.

EXHIBIT X.—BRONCHITIS.—*Stating for the Year and for each Month of the Year 1895, what Per Cent of the Weekly Reports of Sickness Stated Presence of Bronchitis and what were the Meteorological Conditions as observed at Stations in Michigan.**

BRONCHITIS.				Temperature, F.		Humidity of Air.§ Av. of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10.°		Av. Velocity of Wind, Miles Per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F.		
														Range.		
Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.		Per Cent of Weekly Reports Stating Presence of.†	Av. Order of Prevalence where Present.†, ‡	Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute — Grains of Vapor in a Cubic Foot of Air.	Inhaled ‖	Exhaled in excess of that Inhaled.¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Monthly and for Year.	Av. Daily, by 3 Daily Observations.**	Average Pressure.
More than Av. Per Cent of Bronchitis.	Feb.	71	2.4	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	*b* 29.126
	Mar.	70	2.7	18.55	27.39	75	1.49	.93	10.75	*a* 48	4.10	4.65	12.2	.916	.238	29.119
	Jan.	66	2.2	15.24	19 04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1.446	.316	29.044
	Apr.	66	2.6	*b*19.90	*b*47.23	*a* 70	2.90	1.81	9.87	*a* 48	4.07	4.55	*a* 9.3	.925	*a* .152	29.125
	May	56	2.4	*b*22.41	*b*59.49	*a* 70	*b* 4.42	2.76	8.92	*a* 44	4.17	4.62	*a* 9 5	*a* .667	*a* .150	*b* 29.135
Av.		52	2.6	19.18	46 37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Bronchitis.	Nov.	52	2.3	*b*15.19	*b*36.03	*a* 79	*b* 2.23	1.39	10.29	*a* 65	3.19	3.46	10.2	*a* .968	*a* .212	29.201
	Dec.	52	2.4	*b*13.59	*b*28.68	*a* 82	*b* 1.82	1.14	10.54	*a* 73	*a* 3.74	*a* 4.24	*a* 10 5	*a*1.000	*a* .236	*b* 29.072
	June	47	2.6	24.11	70.60	66	5.56	3.48	8.20	36	3.51	*a* 4.16	8.3	.562	.117	29.184
	Oct.	44	2.5	*b*18 64	*b*44 54	72	*b* 2.76	1.73	9.95	41	3.04	3.33	*a* 11 9	*a*1.039	*a*. 241	29.152
	Sept.	35	3.2	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	*a* 10.7	.660	.193	29.136
	July	34	3.0	23.58	70 10	66	5.39	3.37	8.31	45	2.91	3.57	8 4	.720	.157	29.125
	Aug.	34	3.2	21.93	70.11	72	5.87	3.67	8.01	38	*a* 3.92	*a* 4.27	8.1	.527	.135	*b*29.077

a An exception to the proposition that more than the average per cent of weekly reports stated presence of bronchitis in months when the meteorological condition named at the head of the column was greater than the average for the year; and less in months when the same condition was less than the average. See proposition 1, relating to bronchitis, page 118.

b An exception to the proposition that more than the average per cent of weekly reports stated presence of bronchitis in months when the meteorological condition named at the head of the column was less than the average for the year and less in months when the same condition was greater than the average for the year See proposition 2, relating to bronchitis, page 118.

* How many stations, and what stations are represented in the statements for each meteorological subject may be seen by referring to Exhibit VIII, in which the stations are named, and a statement for the year 1895, in relation to each meteorological subject, is given for each station included in the average for that subject In Exhibit VIII., is also stated what time the tri-daily observations were made at each station. Additional statements relative to meteorological conditions may be found in an article on the Principal Meteorological Conditions in Michigan in 1895, on pages 1-78 of this Report.

† Explanations of statements in these columns, and other statements relative to the prevalence, in 1895, of the diseases under consideration may be found in Tables 2 and 4 of this Report, and also in Diagrams 1, 2, 3, 4 and 5. When the per cent of reports stated for any disease is the same for two months or for any month is the same as the average, the order of months in the first column of these exhibits has been determined by reference to fractional per cents.

‡ Small numbers in this column indicate great prevalence in the localities where the disease occurred, as compared with other diseases; and large numbers a less prevalence.

§ Calculated from readings of dry bulb and wet bulb thermometers.

‖ Calculated for 18 respirations per minute, of 20cubic inches of air each.

¶ Assuming the air exhaled to be saturated with vapor at the temperature of 98° F, in which case each cubic foot of air contains 18.69 grains of vapor, and 18 respirations per minute, of 20 cubic inches of air each, make 11.68 Troy ounces of vapor exhaled daily. No correction has been made for the expansion of air after it is inhaled.

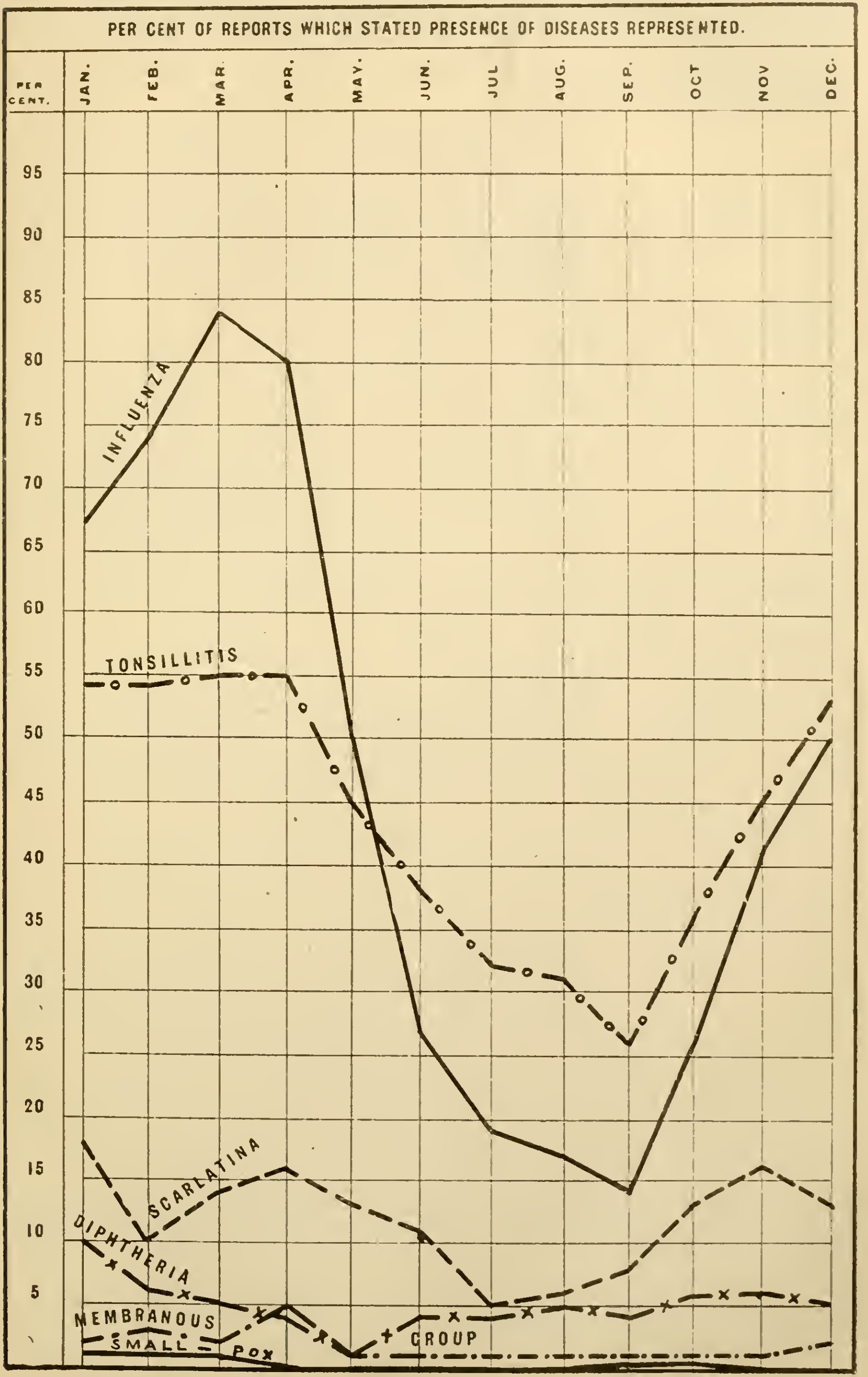
** The daily range from which numbers in this column were computed is the difference between the highest and the lowest of the four observations taken during the 24 hours, namely, at 7 A M, 2 P. M., 9 P. M. of one day, and 7 A. M. of the following day.

EXHIBIT XII.—Pneumonia and Membranous Croup.—*Stating for the Year and for each Month of the Year 1895, what Per Cent of the Weekly Reports of Sickness Stated Presence of Pneumonia and Membranous Croup and what were the Meteorological Conditions as observed at Stations in Michigan.**

Pneumonia.				Temperature, F.		Humidity of Air § Av. of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°.		Av. Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F.		
														Range.		
Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.		Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present. †, ‡.	Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute — Grains of Vapor in a Cubic Foot of Air.	Inhaled.‖	Exhaled in excess of that Inhaled.¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Monthly and for Year.	Av. Daily, by 3 Daily Observations.**	Average Pressure.
More than Av. Per Cent of Pneumonia.	Mar.	45	4.0	18 55	27.39	75	1.49	.93	10.75	*a* 48	4.10	4.65	12.2	.916	.238	29.119
	Feb.	42	3.9	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	*b* 29 126
	Jan.	39	3.3	15.24	19.04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1.446	.316	29.044
	Apr.	35	4.0	*b*19.90	*b*47.23	*a* 70	2.90	1.81	9.87	*a* 48	4.07	4.55	*a* 9.3	.925	*a* .152	29.125
	Dec.	22	3.7	13.59	28.68	82	1.82	1.14	10.54	73	3.74	4.24	10.5	1.000	.236	29.072
Av.		21	3.7	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Pneumonia.	May	19	3.5	22.41	59.49	70	4.42	2.76	8.92	44	*a* 4.17	*a* 4.62	9.5	.667	.150	29.135
	Nov.	18	3.3	*b*15.19	*b*36 03	*a* 79	*b* 2.23	1.39	10.29	*a* 65	3.19	3.46	10.2	*a* .968	*a* .212	29.201
	Oct.	9	3.2	*b*18.64	*b*44.54	72	*b* 2.76	1.73	9.95	44	3.04	3.33	*a* 11 9	*a*1.039	*a* .241	29.152
	June	8	3.8	24 11	70.60	66	5.56	3.48	8.20	36	3.51	*a* 4.16	8.3	.562	.117	29.184
	July	8	3.2	23.58	70.10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29.125
	Aug.	5	4.2	21.93	70.11	72	5.87	3.67	8.01	38	*a* 3.92	*a* 4.27	8.1	.527	.135	*b* 29.077
	Sept.	4	4.6	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	*a* 10.7	.660	.193	29.136
MEMBRANOUS CROUP.																
More than Av. Pr. Ct. of Mem. Croup.	Apr.	5	5.4	*b*19.90	*b*47.23	*a* 70	2.90	1.81	9.87	*a* 48	4.07	4.55	*a* 9.3	.925	*a* .152	29.125
	Feb.	3	4.0	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	*b* 29.126
Av.		2	4.6	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Membranous Croup.	Jan.	2	3.3	*b*15.24	*b*19.04	*a* 80	*b* 1.19	.74	10.94	*a* 68	*a* 4.18	*a* 4.15	*a* 11.8	*a*1 446	*a* .316	*b* 29.044
	Mar.	2	4.8	*b*18.55	*b*27.39	*a* 75	*b* 1.49	.93	10.75	48	*a* 4.10	*a* 4.65	*a* 12.2	*a* .916	*a* .238	*b* 29.119
	Dec.	2	7.0	*b*13.59	*b*28.68	*a* 82	*b* 1.82	1.14	10.54	*a* 73	*a* 3.74	*a* 4.24	*a* 10.5	*a*1.000	*a* .236	*b* 29 072
	May	1	7.0	22.41	59.49	70	4.42	2.76	8.92	44	*a* 4.17	*a* 4.62	9.5	.667	.150	29.135
	June	1	3.5	24.11	70.60	66	5.56	3.48	8.20	36	3.51	*a* 4.16	8.3	.562	.117	29.184
	July	1	4.0	23.58	70 10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29.125
	Aug.	1	6.0	21.93	70.11	72	5.87	3.67	8.01	38	*a* 3.92	*a* 4.27	8.1	.527	.135	*b* 29.077
	Sept.	1	4.0	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	*a* 10.7	.660	.193	29.136
	Nov.	1	2.0	*b*15.19	*b*36.03	*a* 79	*b* 2.23	1.39	10.29	*a* 65	3.19	3.46	10.2	*a* .968	*a* .212	29.201
	Oct.	0.7	4.7	*b*18.64	*b*44.54	72	*b* 2.76	1.73	9.95	44	3.04	3.33	*a* 11.9	*a*1.039	*a* .241	29.152

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks. see Exhibit X.
a An exception to Proposition 1, relating to Pneumonia and Membranous Croup, on page 119.
b An exception to Proposition 2, relating to Pneumonia and Membranous Croup, on page 119.

DIAGRAM 2–WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1895.



[PLATE 870]

EXHIBIT XIII.—*By Year and Months for 1895 and for the preceding year, and an Average for the eighteen Years, 1877-94.* Stating on what Per Cent of the Weekly Reports received* PNEUMONIA, MEMBRANOUS CROUP, DIPHTHERIA, RHEUMATISM, INFLUENZA, SCARLET FEVER, NEURALGIA* AND TONSILLITIS,* *were Reported Present, and Comparing the Per Cents for Months in 1895, with the Averages for Corresponding Months in those years.*†

	Years, etc.	Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Pneumonia.	Av. 18 years, 1877-1894	32	53	56	53	47	35	21	13	11	15	19	29	39
	Av. 9 years, 1886-1894	26	46	47	43	38	29	16	10	9	12	16	24	33
	1894	20	37	32	30	30	24	15	9	7	10	13	21	27
	1895	21	39	42	45	35	19	8	8	5	4	9	18	22
	In 1895 **Greater** than Av. 1877-1894	--	--	--	--	--	--	--	--	--	--	--	--	--
	In 1895 **Less** than Av. 1877-94	11	14	14	8	12	16	13	5	6	11	10	11	17
	In 1895 **Greater** than Av. 1886-1894‡	--	--	--	2	--	--	--	--	--	--	--	--	--
	In 1895 **Less** than Av. 1886-94‡	5	7	5	--	3	10	8	2	4	8	7	6	11

	Years, etc.	Year.	Jan.	Feb.	March.	April.	May.	June.	July	Aug.	Sept	Oct.	Nov.	Dec
Membranous Croup.	Av. 18 years, 1877-1894	5	9	8	6	6	4	3	2	2	3	5	7	8
	Av. 9 years, 1886-1894	3	6	5	4	4	3	2	1	1	2	4	5	5
	1894	2	3	2	1	2	3	2	1	0.3	0	4	4	2
	1895	2	2	3	2	5	1	1	1	1	1	0.7	1	2
	In 1895 **Greater** than Av. 1877-1894	--	--	--	--	--	--	--	--	--	--	--	--	--
	In 1895 **Less** than Av. 1877-94	3	7	5	4	1	3	2	1	1	2	4.3	6	6
	In 1895 **Greater** than Av. 1886-1894‡	--	--	--	--	1	--	--	=	=	--	--	--	--
	In 1895 **Less** than Av. 1886-94‡	1	4	2	2	--	2	1	=	=	1	3.3	4	3

	Years, etc.	Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Diphtheria.	Av. 18 years, 1877-1894	15	19	17	15	14	12	11	11	11	12	19	21	20
	Av. 9 years, 1886-1894	8	10	8	7	7	7	6	6	6	7	10	11	10
	1894	7	5	8	8	6	6	7	4	7	8	9	11	12
	1895	5	10	6	5	4	1	4	4	5	4	6	6	5
	In 1895 **Greater** than Av. 1877-1894	--	--	--	--	--	--	--	--	--	--	--	--	--
	In 1895 **Less** than Av. 1877-94	10	9	11	10	10	11	7	7	6	8	13	15	15
	In 1895 **Greater** than Av. 1886-1894‡	--	=	--	--	--	--	--	--	--	--	--	--	--
	In 1895 **Less** than Av. 1886-94‡	3	=	2	2	3	6	2	2	1	3	4	5	5

	Years, etc.	Year.	Jan.	Feb.	March.	April.	May.	June.	July	Aug.	Sept	Oct.	Nov.	Dec
Rheumatism.	Av. 18 years, 1877-1894	68	72	71	73	74	71	67	61	58	61	66	69	71
	Av. 9 years, 1886-1894	67	70	70	72	73	71	67	61	58	61	66	67	69
	1894	62	65	67	69	66	67	60	58	54	53	58	64	64
	1895	60	60	64	69	69	66	58	53	53	53	60	61	60
	In 1895 **Greater** than Av. 1877-1894	--	--	--	--	--	--	--	--	--	--	--	--	--
	In 1895 **Less** than Av. 1877-94	8	12	7	4	5	5	9	8	5	8	6	8	11
	In 1895 **Greater** than Av. 1886-1894‡	--	--	--	--	--	--	--	--	--	--	--	--	--
	In 1895 **Less** than Av. 1886-94‡	7	10	6	3	4	5	9	8	5	8	6	6	9

	Years, etc.	Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Influenza.	Av. 18 years, 1877-1894	41	62	64	61	53	39	27	19	19	27	32	41	52
	Av. 9 years, 1886-1894	41	65	67	64	55	40	26	17	17	25	30	41	55
	1894	41	87	75	66	55	38	21	15	18	23	29	40	51
	1895	44	67	74	84	80	50	27	19	17	14	26	41	50
	In 1895 **Greater** than Av. 1877-1894	3	5	10	23	27	11	=	=	--	--	--	=	--
	In 1895 **Less** than Av. 1877-94	--	--	--	--	--	--	=	=	2	13	6	=	2
	In 1895 **Greater** than Av. 1886-1894‡	3	2	7	20	25	10	1	2	=	--	--	=	--
	In 1895 **Less** than Av. 1886-94‡	--	--	--	--	--	--	--	--	=	11	4	=	5

	Years, etc.	Year.	Jan.	Feb.	March.	April.	May.	June.	July	Aug.	Sept	Oct.	Nov.	Dec
Scarlet Fever.	Av. 18 years, 1877-1894	14	18	18	18	18	16	14	11	9	11	14	15	15
	Av. 9 years, 1886-1894	10	12	11	12	13	12	10	7	6	8	11	11	12
	1894	14	9	14	13	17	16	15	12	11	14	17	17	17
	1895	12	18	10	14	16	13	11	5	6	8	13	16	13
	In 1895 **Greater** than Av. 1877-1894	--	=	--	--	--	--	--	--	--	--	--	1	--
	In 1895 **Less** than Av. 1877-94	2	=	8	4	2	3	3	6	3	3	1	--	2
	In 1895 **Greater** than Av. 1886-1894‡	2	6	--	2	3	1	1	--	=	=	2	5	1
	In 1895 **Less** than Av. 1886-94‡	--	--	1	--	--	--	--	2	=	=	--	--	--

	Years, etc.	Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Neuralgia.	Av. 16 years, 1879-1894	64	68	70	71	71	65	62	59	56	58	62	66	67
	Av. 9 years, 1886-1894	63	67	69	70	69	64	60	58	56	57	60	63	64
	1894	56	63	59	64	61	57	51	51	47	52	56	57	52
	1895	56	58	63	69	65	63	57	51	49	45	53	52	56
	In 1895 **Greater** than Av. 1879-1894	--	--	--	--	--	--	--	--	--	--	--	--	--
	In 1895 **Less** than Av. 1879-94	8	10	7	2	6	2	5	8	7	13	9	14	11
	In 1895 **Greater** than Av. 1886-1891‡	--	--	--	--	--	--	--	--	--	--	--	--	--
	In 1895 **Less** than Av. 1886-94‡	7	9	6	1	4	1	3	7	7	12	7	11	8

	Years, etc.	Year.	Jan.	Feb.	March.	April.	May.	June.	July	Aug.	Sept	Oct.	Nov.	Dec
Tonsillitis.	Av. 16 years, 1879-1894	48	59	59	59	54	47	39	33	32	36	45	54	58
	Av. 9 years, 1886-1894	47	58	58	58	54	47	37	33	31	35	44	52	57
	1894	42	54	51	50	50	44	30	32	30	31	40	46	49
	1895	43	54	54	55	55	45	38	32	31	26	36	45	53
	In 1895 **Greater** than Av. 1879-1894	--	--	--	--	1	--	--	--	--	--	--	--	--
	In 1895 **Less** than Av. 1879-94	5	5	5	4	--	2	1	1	1	10	9	9	5
	In 1895 **Greater** than Av. 1886-1891‡	--	--	--	--	1	--	1	--	=	--	--	--	--
	In 1895 **Less** than Av. 1886-94‡	4	4	4	3	--	2	--	1	=	9	8	7	4

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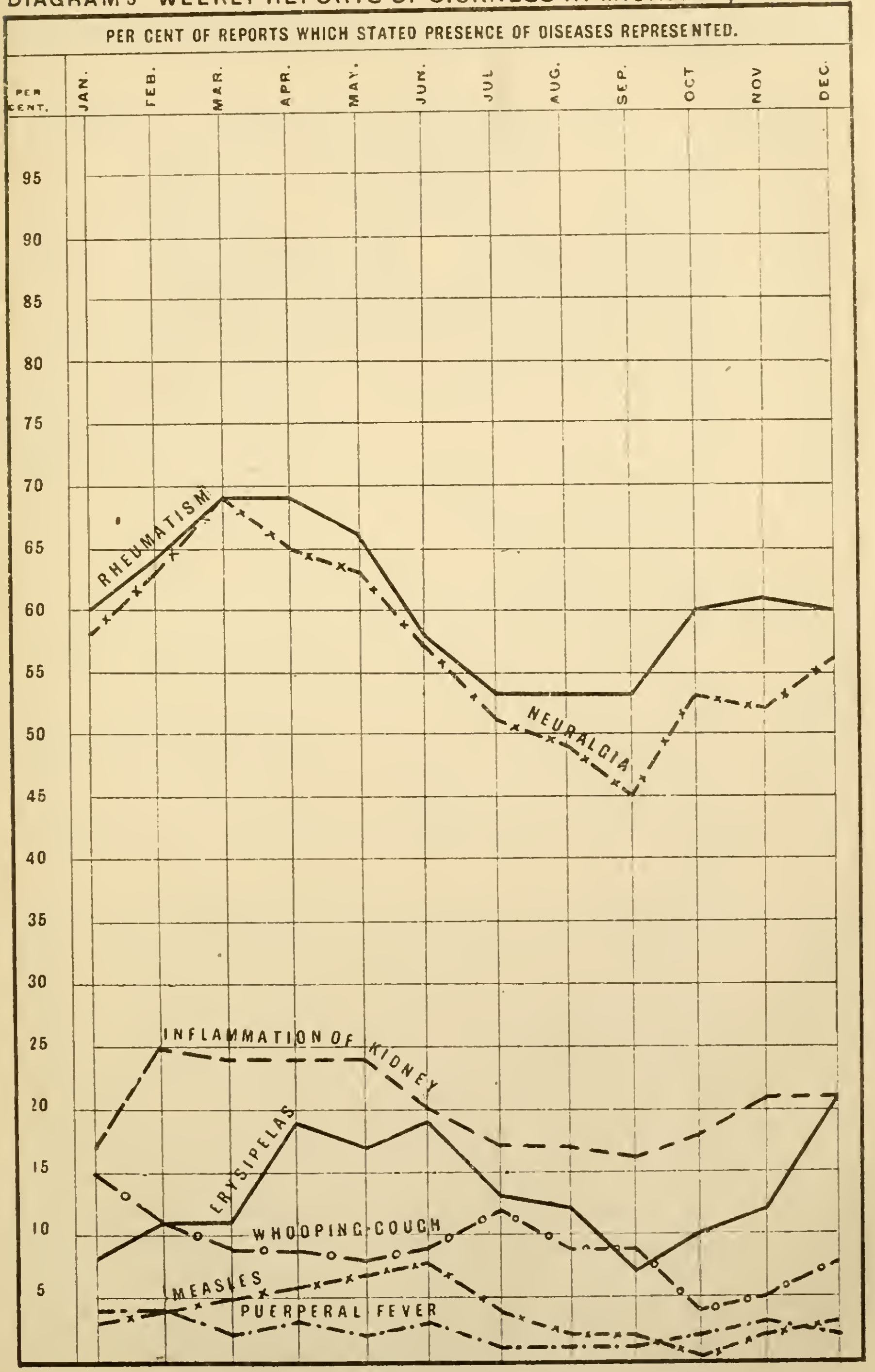
* The average line for tonsillitis and neuralgia includes only the sixteen years, 1879-1894.

† Other statements for 1895, and months in 1895, relative to these diseases are given in Table 2, and in Exhibits XII., XIV., XV. and XVI., where are also given for convenient comparison statements of coincident meteorological conditions.

‡ This comparison is made because of change of plan of reports in May, 1885, as explained on page 80.

The lines for 1895 in Exhibit XIII. are graphically represented in Diagrams 1, 2, 3, and 4 of this article.

DIAGRAM 3—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1895.



[PLATE 871]

EXHIBIT XIV.—DIPHTHERIA AND TONSILLITIS.—*Stating for the Year and for each Month of the Year 1895, what Per Cent of the Weekly Reports of Sickness Stated Presence of Diphtheria and Tonsillitis and what were the Meteorological Conditions as Observed at Stations in Michigan.**

DIPHTHERIA.				Temperature, F.		Humidity of Air.§ Av. of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°.		Av. Velocity of Wind, Miles Per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F.		
Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.		Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present.†, ‡.	Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute — Grains of Vapor in a Cubic Foot of Air.	Inhaled.‖	Exhaled in excess of that Inhaled.¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Range. Monthly and for Year.	Range. Av. Daily, by 3 Daily Observations.**	Average Pressure.
More than Av. Per Cent of Diphtheria.	Jan.	10	4.6	15.24	19.04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1.446	.316	29.044
	Feb.	6	5.1	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	*b*29.126
	Oct.	6	3.0	18.64	44.54	72	2.76	1.73	9.95	*a* 44	*a* 3.04	*a* 3.33	11.9	1.039	.241	*b*29.152
	Nov.	6	4.6	15.19	36.03	79	2.23	1.39	10.29	65	*a* 3.19	*a* 3.46	10.2	.968	.212	*b*29.201
Av.		5	4.4	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Diphtheria.	Mar.	5	4.8	*b*18.55	*b*27.39	*a* 75	*b* 1.49	.93	10.75	48	*a* 4.10	*a* 4.65	*a* 12.2	*a* .916	*a* .238	*b*29.119
	Aug.	5	4.9	21.93	70.11	72	5.87	3.67	8.01	38	*a* 3.92	*a* 4.27	8.1	.527	.135	*b*29.077
	Dec.	5	5.7	*b*13.59	*b*28.68	*a* 82	*b* 1.82	1.14	10.54	*a* 73	*a* 3.74	*a* 4.24	*a* 10.5	*a*1.000	*a* .236	*b*29.072
	Apr.	4	5.0	19.90	47.23	70	*b* 2.90	1.81	9.87	48	*a* 4.07	*a* 4.55	9.3	*a* .925	.152	29.125
	June	4	4.1	24.11	70.60	66	5.56	3.48	8.20	36	3.51	*a* 4.16	8.3	.562	.117	29.184
	July	4	3.8	23.58	70.10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29 125
	Sept.	4	3.1	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	*a* 10.7	.660	.193	29.136
	May	1	7.0	22.41	59 49	70	4.42	2.76	8.92	44	*a* 4.17	*a* 4.62	9.5	.667	.150	29.135
TONSILLITIS.																
More than Av. Per Cent of Tonsillitis.	Mar.	55	3.4	18 55	27.39	75	1.49	.93	10.75	*a* 48	4.10	4.65	12.2	.916	.238	29.119
	Apr.	55	3.4	*b*19.90	*b*47.23	*a* 70	2.90	1.81	9.87	*a* 48	4.07	4.55	*a* 9.3	.925	*a* .152	29.125
	Jan.	54	2.9	15.24	19.04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1.446	.316	29 044
	Feb.	54	3.1	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	*b*29.126
	Dec.	53	2.5	13.59	28.68	82	1.82	1.14	10.54	73	3.74	4.24	10.5	1.000	.236	29.072
	May	45	2.8	*b*22.41	*b*59.49	*a* 70	*b* 4.42	2.76	8.92	*a* 44	4.17	4.62	*a* 9.5	*a* .667	*a* .150	*b*29.135
	Nov.	45	2.7	15.19	36.03	79	2.23	1.39	10.29	65	*a* 3.19	*a* 3.46	10.2	.968	.212	*b*29.201
Av.		43	3.0	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Tonsillitis.	June	38	2.7	24.11	70.60	66	5.56	3.48	8.20	36	3.51	*a* 4.16	8.3	.562	.117	29.184
	Oct.	36	2.6	*b*18.64	*b*44.54	72	*b* 2.76	1.73	9.95	44	3.04	3.33	*a* 11.9	*a*1 039	*a* .241	29.152
	July	32	3.1	23.58	70.10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29.125
	Aug.	31	3.3	21.93	70.11	72	5.87	3.67	8.01	38	*a* 3.92	*a* 4.27	8.1	.527	.135	*b*29.077
	Sept.	26	3.4	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	*a* 10.7	.660	.193	29.136

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X.

a An exception to Proposition 1, relating to Diphtheria and Tonsillitis on page 119.

b An exception to Proposition 2, relating to Diphtheria and Tonsillitis on page 119.

EXHIBIT XV.—INFLUENZA AND SCARLET FEVER.—*Stating for the Year and for each Month of the Year 1895, what Per Cent of the Weekly Reports of Sickness Stated Presence of Influenza and Scarlet Fever and what were the Meteorological Conditions as observed at Stations in Michigan.**

INFLUENZA.				Temperature, F.		Humidity of Air.§ Av of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°.		Av. Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F.		
Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.		Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present.†,‡.	Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute — Grains of Vapor in a Cubic Foot of Air.	Inhaled.‖	Exhaled in excess of that Inhaled.¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Range. Monthly and for Year.	Range. Av. Daily, by 3 Daily Observations.**	Average Pressure.
More than Av. Per Cent of Influenza.	Mar.	84	1.3	18 55	27.39	75	1.49	.93	10.75	*a* 48	4.10	4.65	12.2	.916	.238	29.119
	Apr.	80	1.5	*b*19.90	*b*47.23	*a* 70	2.90	1.81	9.87	*a* 48	4.07	4.55	*a* 9.3	.925	*a* .152	29.125
	Feb.	74	1.4	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	*b*29.126
	Jan.	67	1.7	15 24	19.04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1 446	.316	29.044
	May	50	2.1	*b*22.41	*b*59.49	*a* 70	*b* 4.42	2.76	8.92	*a* 44	4.17	4.62	*a* 9.5	*a* .667	*a* .150	*b*29.135
	Dec.	50	2.0	13 59	28.68	82	1.82	1.14	10.54	73	3.74	4.24	10.5	1 000	.236	29 072
Av.		44	2.0	19 18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Influenza.	Nov.	41	2.0	*b*15.19	*b*36.03	*a* 79	*b* 2.23	1.39	10.29	*a* 65	3.19	3.46	10.2	*a* .968	*a* .212	29.201
	June	27	2.7	24.11	70.60	66	5.56	3.48	8.20	36	3.51	*a* 4.16	8.3	.562	.117	29.184
	Oct.	26	2.5	*b*18.64	*b*44.54	72	*b* 2.76	1.73	9.95	44	3.04	3.33	*a* 11.9	*a*1.039	*a* .241	29 152
	July	19	2.8	23.58	70 10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29.125
	Aug.	17	2.9	21.93	70.11	72	5.87	3.67	8.01	38	*a* 3.92	*a* 4.27	8.1	.527	.135	*b*29.077
	Sept.	14	3.4	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	*a* 10.7	.660	.193	29 136
SCARLET FEVER.																
More than Av. Per Cent of Scarlet Fever.	Jan.	18	3.7	15 24	19.04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1.446	.316	29 044
	Apr.	16	3.9	*b*19.90	*b*47.23	*a* 70	2.90	1.81	9.87	*a* 48	4.07	4.55	*a* 9.3	.925	*a* .152	29.125
	Nov.	16	3.0	15.19	36.03	79	2.23	1.39	10.29	65	*a* 3.19	*a* 3.46	10.2	.968	.212	*b*29.201
	Mar.	14	3.9	18.55	27.39	75	1.49	.93	10.75	*a* 48	4.10	4.65	12.2	.916	.238	29.119
	May	13	3.3	*b*22.41	*b*59.49	*a* 70	*b* 4.42	2.76	8.92	*a* 44	4.17	4.62	*a* 9.5	*a* .667	*a* .150	*b*29.135
	Oct.	13	2.9	18.64	44 54	*a* 72	2.76	1.73	9.95	*a* 44	*a* 3.04	*a* 3.33	11.9	1.039	.241	*b*29.152
	Dec.	13	3.1	13.59	28.68	82	1.82	1.14	10.54	73	3.74	4.24	10.5	1.000	.236	29.072
Av.		12	3.5	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Scarlet Fever.	June	11	2.7	24.11	70.60	66	5.56	3.48	8.20	36	3.51	*a* 4.16	8.3	.562	.117	29.184
	Feb.	10	3.8	*b*16.07	*b*17.27	*a* 78	*b* 1.17	.73	10.95	*a* 57	*a* 4.05	*a* 4.60	*a* 11.7	*a*1.225	*a* .266	29.126
	Sept.	8	3.5	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	*a* 10.7	.660	.193	29.136
	Aug.	6	3.8	21.93	70.11	72	5.87	3.67	8.01	38	*a* 3.92	*a* 4.27	8.1	.527	.135	*b*29.077
	July	5	4.0	23.58	70.10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29.125

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X.

a An exception to Proposition 1, relating to Influenza and Scarlet Fever, on page 119.

b An exception to Proposition 2, relating to Influenza and Scarlet Fever, on page 119.

EXHIBIT XVI.—RHEUMATISM AND NEURALGIA.—*Stating for the Year and for each Month of the Year 1895, what Per Cent of the Weekly Reports of Sickness Stated Presence of Rheumatism and Neuralgia and what were the Meteorological Conditions as Observed at Stations in Michigan.**

RHEUMATISM.				Temperature, F.		Humidity of Air.§ Av. of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°.		Av. Velocity of Wind, Miles Per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F.		
Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.		Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present.†, ‡.	Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute — Grains of Vapor in a Cubic Foot of Air.	Inhaled.‖	Exhaled in excess of that Inhaled.¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Range.		Average Pressure.
														Monthly and for Year.	Av. Daily, by 3 Daily Observations.**	
More than Av. Per Ct. of Rheumatism.	Mar.	69	3.3	18 55	27.39	75	1.49	.93	10.75	a 48	4.10	4.65	12.2	.916	.238	29.119
	Apr.	69	3.0	b19 90	b47.23	a 70	2.90	1.81	9.87	a 48	4.07	4.55	a 9.3	.925	a .152	29.125
	May	66	2.4	b22.41	b59.49	a 70	b 4.42	2.76	8.92	a 44	4.17	4.62	a 9.5	a .667	a .150	b29.135
	Feb.	64	2.8	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	b29.126
	Nov.	61	2.2	15.19	36 03	79	2.23	1.39	10.29	65	a 3.19	a 3.46	10.2	968	.212	b29.201
Av.		60	2.7	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Rheumatism.	Jan.	60	3.0	b15.24	b19.04	a 80	b 1.19	.74	10.94	a 68	a 4.18	a 4.15	a 11.8	a1.446	a .316	b29.044
	Oct.	60	2.4	b18.64	b44.54	72	b 2.76	1.73	9.95	44	3.04	3.33	a 11.9	a1 039	a .241	29.152
	Dec.	60	2.5	b13 59	b28.68	a 82	b 1.82	1.14	10.54	a 73	a 3.74	a 4.24	a 10 5	a1 000	a .236	b29.072
	June	58	2.3	24 11	70.60	66	5.56	3.48	8.20	36	3.51	a 4.16	8.3	.562	.117	29 184
	July	53	2.5	23.58	70.10	66	5.39	3 37	8.31	45	2.91	3.57	8.4	.720	.157	29.125
	Aug.	53	2.9	21.93	70.11	72	5.87	3.67	8.01	38	a 3.92	a 4.27	8.1	.527	.135	b29.077
	Sept.	53	2.8	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	a 10.7	.660	.193	29.136
NEURALGIA.																
More than Av. Per Cent of Neuralgia.	Mar.	69	3.0	18.55	27.39	75	1.49	.93	10.75	a 48	4.10	4.65	12.2	.916	.238	29 119
	Apr.	65	2.9	b19.90	b47.23	a 70	2.90	1.81	9.87	a 48	4.07	4.55	a 9.3	.925	a .152	29.125
	Feb.	63	2.8	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	b29.126
	May	63	2.1	b22.41	b59.49	a 70	b 4.42	2.76	8.92	a 44	4.17	4.62	a 9.5	a .667	a .150	b29.135
	Jan.	58	2.6	15.24	19.04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1.446	.316	29.044
	June	57	2.0	b24.11	b70.60	a 66	b 5.56	3.48	8.20	a 36	a 3.51	4.16	a 8.3	a .562	a .117	b29.184
Av.		56	2.5	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Neuralgia	Dec.	56	2.5	b13 59	b28.68	a 82	b 1.82	1.14	10.54	a 73	a 3.74	a 4.24	a 10.5	a1.000	a .236	b29.072
	Oct.	53	2.4	b18.64	b44.54	72	b 2.76	1.73	9.95	44	3.04	3.33	a 11.9	a1.039	a .241	29.152
	Nov.	52	2.3	b15.19	b36 03	a 79	b 2.23	1.39	10.29	a 65	3.19	3.46	10.2	a .968	a .212	29.201
	July	51	2.4	23.58	70.10	66	5 39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29.125
	Aug.	49	2.5	21.93	70.11	72	5.87	3.67	8.01	38	a 3.92	a 4.27	8.1	.527	.135	b29.077
	Sept.	45	2.7	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	a 10.7	.660	.193	29.136

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X.

a An exception to Proposition 1, relating to Rheumatism and Neuralgia on page 119.

b An exception to Proposition 2, relating to Rheumatism and Neuralgia on page 119.

EXHIBIT XVII.—PULMONARY CONSUMPTION AND PLEURITIS.—*Stating for the Year and for each Month of the Year 1895, what Per Cent of the Weekly Reports of Sickness Stated Presence of Pulmonary Consumption and Pleuritis and what were the Meteorological Conditions as observed at Stations in Michigan.**

CONSUMPTION.				Temperature, F.		Humidity of Air.§ Av. of 3 Daily Observations		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°.		Av. Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F.		
	Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.	Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present.†, ‡.	Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute — Grains of Vapor in a Cubic Foot of Air.	Inhaled.‖	Exhaled in excess of that Inhaled.¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Range. Monthly and for Year.	Range. Av. Daily, by 3 Daily Observations.**	Average Pressure.
More than Av. Per Cent of Consumption.	Apr.	34	3.6	*b*19.90	*b*47.23	70	2.90	1.81	9.87	*a* 48	4.07	4.55	*a* 9.3	.925	*a* .152	29.125
	Jan.	33	3.7	15.24	19.04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1.446	.316	29.044
	Mar.	33	4.3	18.55	27.39	75	1.49	.93	10.75	*a* 48	4.10	4.65	12.2	.916	.238	29.119
	Feb	31	4.3	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	*b*29 126
	June	30	3.0	*b*24.11	*b*70.60	*a* 66	*b* 5.56	3.48	8.20	*a* 36	*a* 3.51	4.16	*a* 8.3	*a* .562	*a* .117	*b*29.184
Av.		29	3.5	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Consumption.	May	29	2.9	22.41	59.49	70	4.42	2.76	8.92	44	*a* 4.17	*a* 4.62	9.5	.667	.150	29.135
	July	29	3.3	23.58	70.10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29.125
	Aug.	28	3.7	21.93	70.11	72	5.87	3.67	8.01	38	*a* 3.92	*a* 4.27	8.1	.527	.135	*b*29.077
	Sept.	25	3.6	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	*a* 10 7	.660	.193	29 136
	Oct.	25	3.0	*b*18.64	*b*44.54	72	*b* 2.76	1.73	9.95	44	3.04	3.33	*a* 11.9	*a*1.039	*a* .241	29.152
	Nov.	24	3.2	*b*15.19	*b*36 03	*a* 79	*b* 2.23	1.39	10.29	*a* 65	3.19	3.46	10.2	*a* .968	*a* .212	29.201
	Dec.	24	3.3	*b*13 59	*b*28.68	*a* 82	*b* 1.82	1.14	10.54	*a* 73	*a* 3.74	*a* 4.24	*a* 10.5	*a*1.000	*a* .236	*b*29.072
PLEURITIS.																
More than Av. Per Cent of Pleuritis.	Mar.	27	4.6	18.55	27.39	75	1.49	.93	10.75	*a* 48	4.10	4.65	12.2	.916	.238	29.119
	Jan.	25	4.2	15.24	19.04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1.446	.316	29.044
	Feb.	22	4.4	16.07	17 27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	*b*29.126
	Apr.	19	4.1	*b*19.90	*b*47.23	*a* 70	2.90	1.81	9.87	*a* 48	4.07	4.55	*a* 9.3	.925	*a* .152	29.125
	Dec.	19	4.0	13.59	28.68	82	1.82	1.14	10.54	73	3.74	4.24	10.5	1 000	.236	29.072
Av.		17	3.8	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Pleuritis.	Nov.	17	3.3	*b*15.19	*b*36.03	*a* 79	*b* 2.23	1.39	10.29	*a* 65	3.19	3.46	10.2	*a* .968	*a* .212	29 201
	May	16	3.7	22.41	59.49	70	4.42	2.76	8.92	44	*a* 4.17	*a* 4.62	9.5	.667	.150	29.135
	June	14	3.3	24.11	70.60	66	5.56	3.48	8.20	36	3.51	*a* 4.16	8.3	.562	.117	29.184
	July	13	3.1	23.58	70.10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29.125
	Oct.	11	2.8	*b*18.64	*b*44.54	72	*b* 2.76	1.73	9.95	44	3.04	3.33	*a* 11.9	*a*1.039	*a* .241	29.152
	Aug.	9	3.4	21.93	70.11	72	5.87	3.67	8.01	38	*a* 3.92	*a* 4.27	8.1	.527	.135	*b*29.077
	Sept.	9	3.6	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	*a* 10.7	.660	.193	29.136

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X.

a An exception to Proposition 1, relating to Pulmonary Consumption and Pleuritis, on page 133.

b An exception to Proposition 2, relating to Pulmonary Consumption and Pleuritis, on page 133.

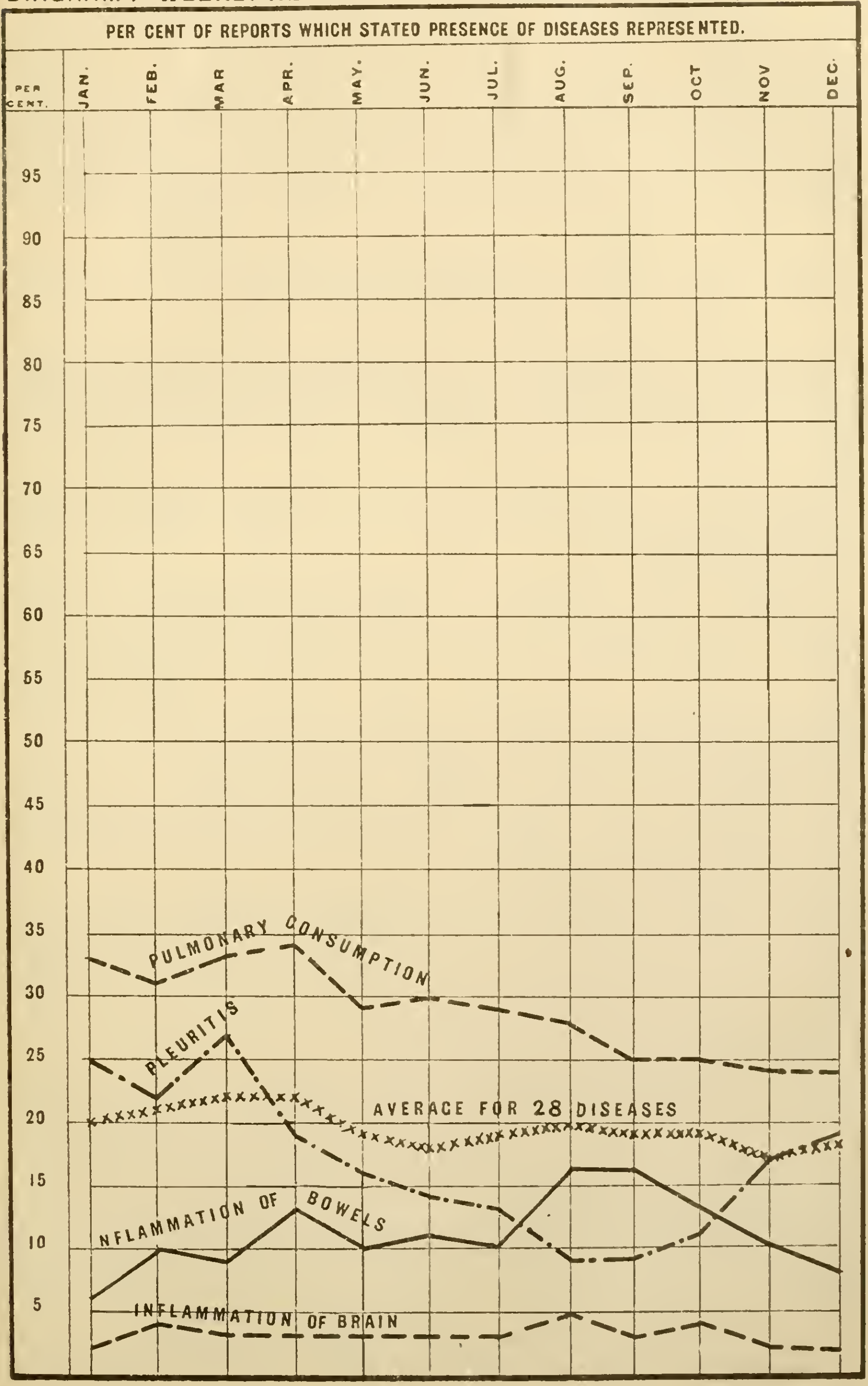
EXHIBIT XVIII.—SICKNESS FROM CONSUMPTION.—1877-95.—*By Year and Months for each of the nineteen years, 1877-95, and an Average for the seventeen years, 1878-94, also for the nine years, 1886-94; Stating on what Per Cent of the Weekly Reports received* CONSUMPTION *was reported Present, and Comparing the Per Cents for 1895 with the Averages for corresponding Months in those Years.*

Years, etc.	Annual Av.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Average 17 years, 1878-94*	56	57	58	59	61	58	56	54	52	53	54	54	54
Average 9 years, 1886-94	46	49	48	50	52	49	46	44	44	44	43	44	45
1877*	52	50	47	47	53	49	50	43	35	38	54	68	65
1878	71	67	72	76	75	72	68	68	65	70	73	73	71
1879	70	71	71	69	77	74	73	69	67	67	69	67	64
1880	68	65	69	70	72	70	69	66	62	66	66	68	70
1881	71	74	76	73	76	69	68	67	67	70	73	74	67
1882	66	66	68	66	66	69	66	67	63	63	65	62	65
1883	61	69	66	66	65	62	61	59	55	57	58	58	60
1884	63	56	61	66	70	67	65	63	63	63	65	61	58
1885	58	60	68	71	69	58	61	56	52	54	55	56	56
1886	55	61	58	60	61	60	55	51	52	48	51	55	54
1887	51	53	54	61	61	54	48	48	47	45	48	47	50
1888	49	50	51	52	47	53	56	51	49	44	43	44	48
1889	48	49	49	50	50	46	47	47	46	50	52	49	51
1890	52	50	53	55	61	57	52	45	50	51	51	49	55
1891	49	58	51	54	59	55	46	45	43	43	44	46	45
1892	38	45	45	40	41	33	35	39	37	39	36	34	37
1893	38	35	38	43	45	43	37	35	37	37	32	37	38
1894	36	36	33	33	41	40	37	39	35	37	34	33	29
1895 (see Diagram on opposite page)	29	33	31	33	34	29	30	29	28	25	25	24	24
In 1895 Less than Av. 1878-94	27	24	27	26	27	29	26	25	24	28	29	30	30
In 1895 Less than Av. 1886-94†	17	16	17	17	18	20	16	15	16	19	18	20	21

*As consumption was not printed on the first blanks, nor on all used in 1877, that year is excluded from the average line.

† This comparison is made because of change of plan of reports in May, 1885, as explained on page 80.

DIAGRAM 4—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1895.



[PLATE 872]

RELATIONS OF DIARRHEA TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That in months when **more** than the average per cent of weekly reports stated the presence of diarrhea, the average daily temperature, the average daily range of temperature, the absolute humidity of the atmosphere, and the average daily pressure of the atmosphere were **greater** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of diarrhea, these conditions were **less** than the average for the year. In Exhibit XIX., the letter *a* marks exceptions to this proposition for the year 1895.

PROPOSITION 2.—That in months when **more** than the average per cent of weekly reports stated the presence of diarrhea, the relative humidity of the atmosphere, the average per cent of cloudiness, the ozone, the average velocity of the wind, and the monthly and average daily range of the barometer were **less** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of diarrhea, these conditions were **greater** than the average for the year. In Exhibit XIX., the letter *b* marks exceptions to this proposition for 1895.

Explanations of Propositions 1 and 2 are given on page 118, and a summary of the evidence in Exhibit XIX., is given in Exhibit XXVI., on a following page.

PROPOSITION 3.—For those months which are not, as regards the absolute humidity of the atmosphere, exceptions to Proposition 1, it is true also that the quantity of vapor inhaled daily was **greater** than the average, and the quantity exhaled daily in excess of that inhaled was **less** than the average in months when **more** than the average per cent of reports stated presence of diarrhea; and that **less** vapor was inhaled and a **greater** excess exhaled daily in months when the per cent of reports stating presence of diarrhea, was **less** than the average.

Proposition 3 is true also in relation to cholera infantum, intermittent fever, remittent fever, typhoid fever, typho-malarial fever, measles, whooping-cough, cholera morbus and dysentery, treated in Exhibits XIX., XXI., XXII., XXIII. and XXIV.

On what per cent of the weekly reports received, by months in the eighteen years, 1877–1894, the ten foregoing diseases were reported present, is stated in Exhibit XX. In Diagram 1, page 87, is graphically represented by months what per cent of the reports in each month in 1895, stated the presence of diarrhea.

The greatest sickness reported from diarrhea in 1895, was in the months of August, September, July and October.

As shown by Exhibit XX., the reports indicate a slightly decreased prevalence of diarrhea in the year 1895. Compared with the year 1894, there was a slightly increased prevalence of diarrhea in March, May, June, July, August and October; a marked increase in February and April; and a slightly decreased prevalence in January and November. In September and December it was the same.

Compared with the average for corresponding months in the eighteen years, 1877–1894, the per cent of reports of diarrhea in 1895 show a slight increase in February, April and June, and a decrease in January, May, and July to December inclusive. In March it was the same.

The average temperature was slightly higher in 1895, than the average for the eighteen years, 1877–1894. In 1895, it was also higher in the months of April, May, June, August, September and December; and lower in the months of January, February, March, July, October and November. The absolute humidity was slightly less in 1895, than the average for the eighteen years, 1877–1894. In 1895, it was more in the months of April, May, June, August, September and December; and less in the months of January, February, March, July, October and November, than the average in the corresponding months in the eighteen years, 1877–1894. The relative humidity was less for the year and each month of the year 1895, except May (being the same), than the average for the seventeen years, 1878–1894.

RELATIONS OF CHOLERA INFANTUM AND OTHER "WARM WEATHER" DISEASES TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That in months when **more** than the average per cent of weekly reports stated the presence of cholera infantum (or of intermittent fever, remittent fever, typhoid fever, typho-malarial fever, cholera morbus, dysentery, measles, or whooping-cough), the average daily temperature, the average daily range of temperature, the absolute humidity of the atmosphere, and the average daily pressure of the atmosphere were **greater** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of cholera infantum (or of the other diseases named), these conditions were **less** than the average for the year. In Exhibit XIX., page 134, the letter *a* marks exceptions to this proposition for the year 1895.

Explanations of Propositions 1 and 2 are given on page 118, and a summary of the evidence of Exhibit XIX., is given in Exhibit XXVI., on a following page.

PROPOSITION 2.—That in months when **more** than the average per cent of weekly reports stated the presence of cholera infantum (or of intermittent fever, remittent fever, typhoid fever, typho-malarial fever, measles, or whooping-cough), the relative humidity of the atmosphere, the average per cent of cloudiness, the ozone, the average velocity of the wind, and the monthly and average daily range of the barometer were **less** than the average for the year; and that in months when **less** than the average per cent of reports stated the presence of cholera infantum (or of the other diseases named), these conditions were **greater** than the average for the year. In Exhibit XIX., page 134, the letter *b* marks exceptions to this proposition for 1895.

What per cent of all the weekly reports of sickness in each month in 1895, stated the presence of cholera infantum is graphically represented by months in Diagram 1, page 87. What per cent of the reports received by months in the eighteen years, 1877–94, stated presence of cholera infantum and of the other diseases mentioned in Propositions 1 and 2, is stated in Exhibit XX., page 135.

Cholera infantum was most prevalent during the hot months and in October in 1895. Compared with the average for the eighteen years, 1877–1894, it was more prevalent in 1895 in the months of May, June, September and October, and less prevalent in the months of March, July, August, November and December. In January, February and April it was the same.

EXHIBIT XIX.—DIARRHEA AND CHOLERA INFANTUM.—*Stating for the Year and for each Month of the Year 1895, what Per Cent of the Weekly Reports of Sickness Stated Presence of Diarrhea and Cholera Infantum and what were the Meteorological Conditions as observed at Stations in Michigan.**

DIARRHEA.				Temperature, F.		Humidity of Air.§ Av of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°.		Av. Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F.		
Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.		Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present.†, ‡	Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute — Grains of Vapor in a Cubic Foot of Air	Inhaled.‖	Exhaled in excess of that Inhaled.¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Range.		Average Pressure.
														Monthly and for Year.	Av. Daily, by 3 Daily Observations.**	
More than Av. Per Cent of Diarrhea.	Aug.	73	1.5	21.93	70 11	72	5.87	3.67	8.01	38	*b* 3.92	*b* 4.27	8.1	.527	.135	*a*29.077
	Sept.	71	1.7	20 98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	*b* 10.7	.660	.193	29.136
	July	64	1.8	23.58	70.10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29 125
	Oct.	50	2.1	*a*18.64	*a*44 54	72	*a* 2.76	1.73	9.95	44	3.04	3.33	*b* 11.9	*b*1.039	*b* .241	29.152
	June	44	2.4	24.11	70.60	66	5.56	3.48	8.20	36	3.51	*b* 4.16	8.3	.562	.117	29 184
Av.		42	2.5	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Diarrhea.	Apr.	33	3.6	*a*19.90	*a*47.23	*b* 70	2.90	1.81	9.87	*b* 48	4.07	4.55	*b* 9.3	.925	*b* .152	29.125
	May	30	2.8	*a*22.41	*a*59.49	*b* 70	*a* 4.42	2.76	8.92	*b* 44	4.17	4.62	*b* 9.5	*b* .667	*b* .150	*a*29.135
	Mar.	29	4.0	18.55	27.39	75	1.49	.93	10.75	*b* 48	4.10	4.65	12.2	.916	.238	29 119
	Feb.	28	4.0	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	*a*29.126
	Dec.	24	3.3	13 59	28.68	82	1.82	1.14	10.54	73	3.74	4.24	10.5	1.000	.236	29.072
	Jan.	23	3.5	15.24	19.04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1 446	.316	29.044
	Nov.	21	2.9	15 19	36.03	79	2.23	1.39	10.29	65	*b* 3.19	*b* 3.46	10.2	.968	.212	*a*29.201
CHOLERA INFANTUM.																
More than Av. Per Cent of Cholera Infantum.	Sept.	40	2.9	20 93	65 92	72	5.37	3.36	8.32	38	3.14	3.49	*b* 10.7	.660	.193	29.136
	Aug.	37	2.7	21.93	70 11	72	5.87	3.67	8.01	38	*b* 3.92	*b* 4.27	8.1	.527	.135	*a*29.077
	July	27	2.8	23 58	70.10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29.125
	June	13	3.4	24 11	70 60	66	5.56	3.48	8.20	36	3.51	*b* 4.16	8.3	.562	.117	29.184
	Oct.	13	3.5	*a*18 61	*a*44 54	72	*a* 2.76	1.73	9.95	44	3.04	3.33	*b* 11.9	*b*1.039	*b* .241	29.152
Av.		12	3.0	19 18	46 37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Cholera Infantum.	May	5	3.7	*a*22.41	*a*59 49	*b* 70	*a* 4.42	2.76	8.92	*b* 44	4.17	4.62	*b* 9.5	*b* .667	*b* .150	*a*29.135
	Jan.	2	2.0	15.24	19.04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1.446	.316	29.044
	Apr.	2	6.0	*a*19.90	*a*47 23	*b* 70	2.90	1.81	9.87	*b* 48	4.07	4.55	*b* 9.3	.925	*b* .152	29.125
	Feb.	1	2.2	16.07	17 27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	*a*29 126
	Mar.	1	4.2	18.55	27.39	75	1.49	.93	10.75	*b* 48	4.10	4.65	12.2	.916	.238	29.119
	Nov.	1	3.0	15.19	36.03	79	2.23	1.39	10.29	65	*b* 3.19	*b* 3.46	10.2	.968	.212	*a*29.201
	Dec.	0	0	13.59	28.68	82	1.82	1.14	10.54	73	3.74	4.24	10.5	1.000	.236	29.072

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X.

a An exception to Proposition 1, relating to Diarrhea and Cholera Infantum, on page 132.

b An exception to Proposition 2, relating to Diarrhea and Cholera Infantum, on page 132.

EXHIBIT XX.—*By Year and Months for 1895 and for the preceding year, and an Average for the eighteen Years, 1877-94, also for the nine years, 1886-94. Stating on what Per Cent of the Weekly Reports received* DIPHTHERIA, CHOLERA INFANTUM, INTERMITTENT FEVER, REMITTENT FEVER, TYPHOID FEVER, TYPHO MALARIAL FEVER, MEASLES, WHOOPING-COUGH, CHOLERA MORBUS AND DYSENTERY *were Reported Present, and Comparing the Per Cents for 1895, with the Averages for Corresponding Months in those years.**

	Years, etc.	Year.	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.		Year.	Jan.	Feb.	March.	April.	May.	June.	July	Aug.	Sept	Oct.	Nov.	Dec.
Diarrhea.	Av. 18 years, 1877-1894	45	27	27	29	31	34	42	68	83	78	54	34	27	Cholera Infantum.	13	2	1	2	2	3	9	28	44	34	12	4	2
	Av. 9 years, 1886-1894	44	27	27	29	30	32	39	63	80	75	51	32	27		12	2	1	1	1	3	8	25	40	33	11	3	2
	1894	40	26	17	24	26	27	39	55	72	71	49	26	24		12	1	0	1	2	4	8	22	38	33	13	2	1
	1895	42	23	28	29	33	30	44	64	73	71	50	21	24		12	2	1	1	2	5	13	27	37	40	13	1	0
	In 1895 Greater than Av. 1877-1894	--	--	1	=	2	--	2	--	--	--	--	--	--		--	=	=	--	=	2	4	--	--	6	1	--	--
	In 1895 Less than Av. 1877-94	3	4	--	=	--	4	--	4	10	7	4	13	3		1	=	=	1	=	--	--	1	7	--	--	3	2
	In 1895 Greater than Av. 1886-1894†	--	--	1	=	3	--	5	1	--	--	--	--	--		=	=	=	=	1	2	5	2	--	7	2	--	--
	In 1895 Less than Av. 1886-94†	2	4	--	=	--	2	--	--	7	4	1	11	3		=	=	=	=	--	--	--	--	3	--	--	2	2
Intermittent Fever.	Av. 18 years, 1877-1894	56	46	47	49	56	60	61	33	64	63	61	54	47	Remittent Fever.	38	31	31	32	35	36	38	40	46	49	47	39	34
	Av. 9 years, 1886-1894	38	32	32	34	39	39	40	43	44	43	41	36	31		27	23	22	23	25	25	25	27	33	35	34	29	24
	1894	24	12	16	25	24	24	26	28	28	29	27	21	20		20	12	14	14	17	14	20	20	23	28	28	23	21
	1895	22	17	13	16	19	22	27	30	27	26	23	20	19		20	17	15	15	13	18	23	25	20	24	28	21	22
	In 1895 Greater than Av. 1877-1894	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
	In 1895 Less than Av. 1877-94	34	29	34	33	37	38	34	33	37	37	38	34	28		18	14	16	17	22	18	15	15	26	25	19	18	12
	In 1895 Greater than Av. 1886-1894†	--	--	--	--	--	--	--	--	--	--	--	--	--		--	--	--	--	--	--	--	--	--	--	--	--	--
	In 1895 Less than Av. 1886-94†	16	15	19	18	20	17	13	13	17	17	18	16	12		7	6	7	8	12	7	2	2	13	11	6	8	2
Typhoid Fever.	Av. 18 years, 1877-1894	11	9	7	5	5	5	5	7	13	20	22	19	13	Typho-mal'r'l Fever.	16	13	11	10	9	9	9	12	20	30	32	24	16
	Av. 9 years, 1886-1894	10	7	5	4	3	4	5	6	13	18	20	16	11		10	7	6	6	6	5	5	7	14	19	19	13	8
	1894	11	7	5	4	2	6	5	7	15	23	24	17	13		4	1	1	2	1	1	2	3	6	11	8	7	5
	1895	13	8	5	5	8	3	3	13	19	23	31	24	14		4	2	3	2	3	1	0.3	5	5	5	10	4	1
	In 1895 Greater than Av. 1877-1894	2	--	--	=	3	--	--	6	6	3	9	5	1		--	--	--	--	--	--	--	--	--	--	--	--	--
	In 1895 Less than Av 1877-94	--	1	2	=	--	2	2	--	--	--	--	--	--		12	11	8	8	6	8	8.7	7	15	25	22	20	15
	In 1895 Greater than Av. 1886-1894†	3	1	=	1	5	--	--	7	6	5	11	8	3		--	--	--	--	--	--	--	--	--	--	--	--	--
	In 1895 Less than Av. 1886-94†	--	--	=	--	--	1	2	--	--	--	--	--	--		6	5	3	4	3	4	4.7	2	9	14	9	9	7
Measles.	Av. 18 years, 1877-1894	11	9	13	15	20	23	19	12	6	4	4	5	6	Whooping-cough.	16	15	16	16	15	16	16	18	18	17	14	15	15
	Av. 9 years, 1886-1894	9	8	12	14	17	19	16	9	4	2	3	4	5		12	10	11	11	12	13	12	15	15	13	10	10	10
	1894	6	2	5	9	15	19	13	5	2	1	0.4	1	2		12	8	8	8	12	12	12	12	13	13	13	14	14
	1895	4	3	4	5	6	7	8	4	2	2	0.2	2	3		9	15	11	9	9	8	9	12	9	9	4	5	8
	In 1895 Greater than Av. 1877-1894	--	--	--	--	--	--	--	--	--	--	--	--	--		--	=	--	--	--	--	--	--	--	--	--	--	--
	In 1895 Less than Av. 1877-94	7	6	9	10	14	16	11	8	4	2	3.8	3	3		7	=	5	7	6	8	7	6	9	8	10	10	7
	In 1895 Greater than Av. 1886-1894†	--	--	--	--	--	--	--	--	--	=	--	--	--		--	5	=	--	--	--	--	--	--	--	--	--	--
	In 1895 Less than Av. 1886-94†	5	5	8	9	11	12	8	5	2	=	2.8	2	2		3	--	=	2	3	5	3	3	6	4	6	5	2
Cholera Morbus.	Av. 18 years, 1877-1894	17	3	4	5	5	7	16	41	53	38	15	6	5	Dysentery.	18	7	6	7	7	8	12	27	49	45	23	11	7
	Av. 9 years, 1886-1894	15	3	3	3	4	7	14	35	49	36	13	5	4		16	6	6	6	6	7	10	22	43	41	21	10	6
	1894	14	2	1	3	6	8	14	27	38	37	13	5	4		14	5	2	4	4	5	7	20	38	40	20	9	4
	1895	15	5	6	3	4	7	17	30	37	38	14	4	4		15	5	7	4	5	5	9	27	42	38	25	6	2
	In 1895 Greater than Av. 1877-1894	--	2	2	--	--	=	1	--	--	=	--	--	--		--	--	1	--	--	--	--	=	--	--	2	--	--
	In 1895 Less than Av. 1877-94	2	--	--	2	1	=	--	11	16	=	1	2	1		3	2	--	3	2	3	3	=	7	7	--	5	5
	In 1895 Greater than Av. 1886-1894†	=	2	3	=	=	=	3	--	--	2	1	--	=		--	--	1	--	--	--	--	5	--	--	4	--	--
	In 1895 Less than Av. 1886-94†	=	--	--	=	=	=	--	5	12	--	--	1	=		1	1	--	2	1	2	1	--	1	3	--	4	4

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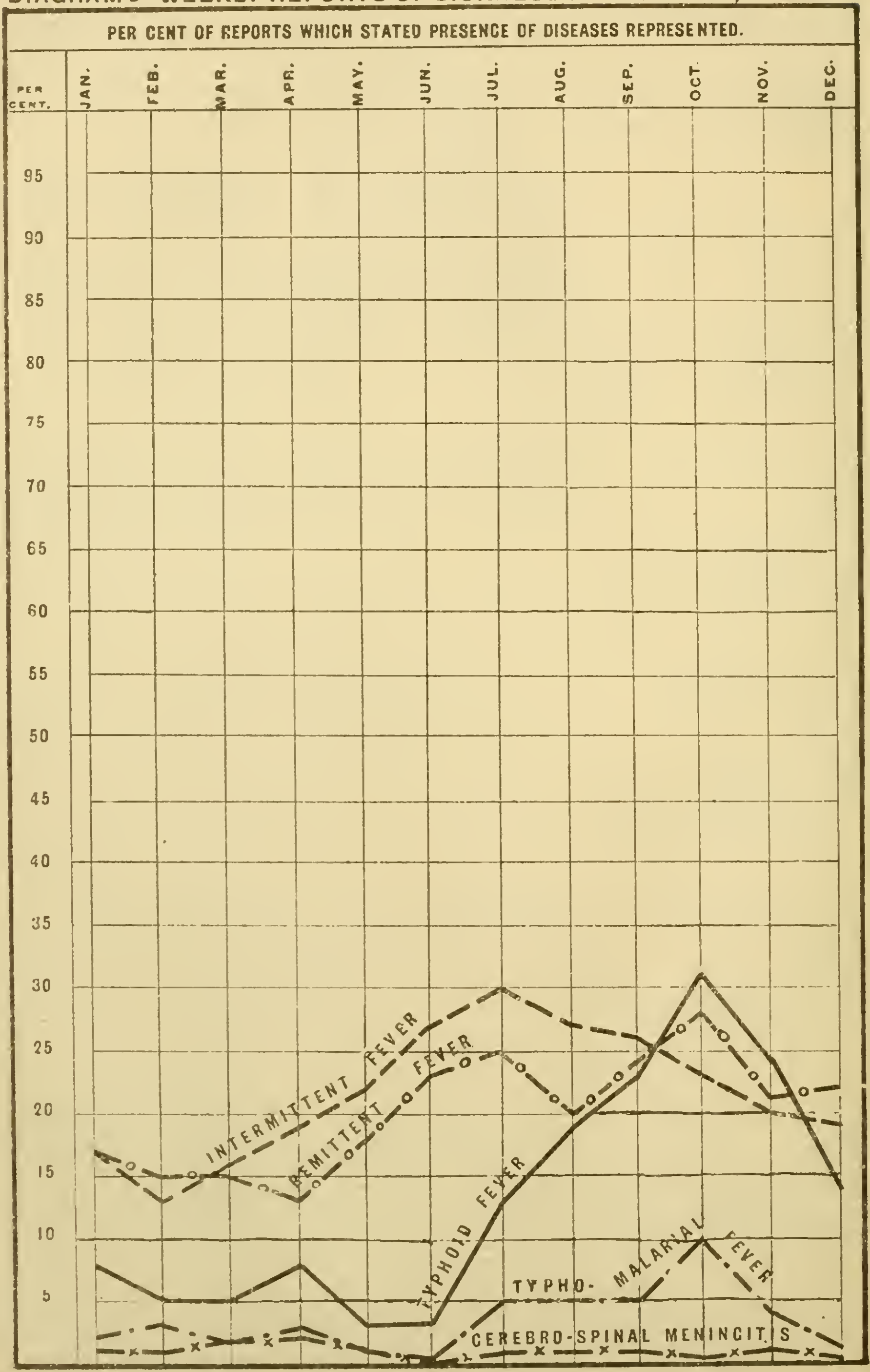
* Other statements for 1895, and months in 1895, relative to these diseases are given in Table 2, and in Exhibits XIX , XXI., XXII., XXIII and XXIV., where are also given for convenient comparison statements of coincident meteorological conditions. The lines for 1895 are graphically represented in Diagrams 1, page 87, 3, page 125, and 5, page 136.

† This comparison is made because of change of plan of reports in May, 1885, as explained on page 80.

DIAGRAM 5—WEEKLY REPORTS OF SICKNESS IN MICHIGAN, IN 1895.



[PLATE 873]

EXHIBIT XXI.—INTERMITTENT FEVER AND REMITTENT FEVER.—*Stating for the Year and for each Month of the Year 1895, what Per Cent of the Weekly Reports of Sickness Stated Presence of Intermittent Fever and Remittent Fever and what were the Meteorological Conditions as Observed at Stations in Michigan.**

INTERMITTENT FEVER.			Temperature, F.		Humidity of Air § Av. of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°.		Av. Velocity of Wind, Miles Per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F.		
Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.	Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present.†, ‡.	Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute — Grains of Vapor in a Cubic Foot of Air.	Inhaled.‖	Exhaled in excess of that Inhaled.¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Range. Monthly and for Year.	Range. Av. Daily, by 3 Daily Observations.**	Average Pressure.
More than Av. Per Cent of Intermittent Fever.															
July	30	2.5	23 58	70.10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29.125
Aug.	27	2.9	21.93	70.11	72	5.87	3.67	8.01	38	b 3.92	b 4.27	8.1	.527	.135	a29 077
June	27	2.4	24.11	70 60	66	5.56	3.48	8.20	36	3.51	b 4.16	8.3	.562	.117	29.184
Sept.	26	2.6	20 98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	b 10.7	.660	.193	29.136
Oct.	23	2.6	a18.64	a44.54	72	a 2.76	1.73	9.95	44	3.04	3.33	b 11.9	b1.039	b .241	29 152
Av.	22	2.9	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Intermittent Fever.															
May	22	3.1	a22.41	a59.49	b 70	a 4.42	2.76	8.92	b 44	4.17	4.62	b 9.5	b .667	b .150	a29.135
Nov.	20	2.8	15.19	36 03	79	2.23	1.39	10.29	65	b 3.19	b 3.46	10.2	.968	.212	a29.201
Dec.	19	3.2	13.59	28.68	82	1.82	1.14	10.54	73	3.74	4.24	10.5	1.000	.236	29.072
Apr.	19	3.8	a19.90	a47.23	b 70	2.90	1.81	9.87	b 48	4.07	4.55	b 9.3	.925	b .152	29 125
Jan.	17	3.2	15.24	19 04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1.446	.316	29.044
Mar.	16	3.4	18.55	27.39	75	1.49	.93	10.75	b 48	4.10	4.65	12.2	.916	.238	29.119
Feb.	13	3.8	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	a29.126
REMITTENT FEVER.															
More than Av. Per Cent of Remittent Fever.															
Oct.	28	2.3	a18.64	a44.54	72	a 2.76	1.73	9.95	44	3.04	3.33	b 11.9	b1.039	b .241	29.152
July	25	3.0	23.58	70.10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29.125
Sept.	24	2.8	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	b 10.7	.660	.193	29.136
June	23	2.8	24.11	70 60	66	5.56	3.48	8.20	36	3.51	b 4.16	8.3	.562	.117	29.184
Dec.	22	3.2	a13.59	a28.68	b 82	a 1.82	1.14	10.54	b 73	b 3.74	b 4.24	b 10.5	b1 000	b .236	a29.072
Nov.	21	2.4	a15.19	a36.03	b 79	a 2.23	1.39	10.29	b 65	3.19	3.46	10.2	b .968	b .212	29.201
Av.	20	3.1	19.18	46.37	74	3.35	2.03	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Remittent Fever.															
Aug.	20	3.2	a21.93	a70.11	b 72	a 5.87	3.67	8 01	b 38	3.92	4.27	b 8.1	b .527	b .135	29.077
May	18	3.0	a22.41	a59.49	b 70	a 4.42	2.76	8.92	b 44	4.17	4.62	b 9.5	b .667	b .150	a29.135
Jan.	17	3.5	15.24	19 04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1.446	.316	29.044
Feb.	15	4.3	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	a29.126
Mar.	15	4.3	18.55	27.39	75	1.49	.93	10.75	b 48	4.10	4.65	12.2	.916	.238	29.119
Apr.	13	3.7	a19.90	a47.23	b 70	2.90	1.81	9.87	b 48	4.07	4.55	b 9.3	.925	b .152	29.125

*, †, ‡, §, ||, ¶, **. For foot-notes with these marks, see Exhibit X.

a An exception to Proposition 1, relating to Intermittent Fever and Remittent Fever, on page 133.

b An exception to Proposition 2, relating to Intermittent Fever and Femittent Rever, on page 133.

EXHIBIT XXII.—Typhoid Fever and Typho-Malarial Fever.—*Stating for the Year and for each Month of the Year 1895, what Per Cent of the Weekly Reports of Sickness Stated Presence of Typhoid Fever and Typho Malarial Fever and what were the Meteorological Conditions as observed at Stations in Michigan.**

Typhoid Fever.				Temperature, F.		Humidity of Air § Av. of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°.		Av. Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F.		
														Range.		
Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.		Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present †.‡	Av. Daily Range by Registering Thermometers	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute — Grains of Vapor in a Cubic Foot of Air.	Inhaled.‖	Exhaled in excess of that Inhaled.¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Monthly and for Year.	Av. Daily, by 3 Daily Observations.**	Average Pressure.
More than Av. Per Cent of Typhoid Fever.	Oct.	31	2.7	*a*18 64	*a*44.54	72	*a* 2.76	1.73	9.95	44	3.04	3.33	*b* 11 9	*b*1.039	*b* .241	29.152
	Nov.	24	3.1	*a*15.19	*a*36.03	*b* 79	*a* 2.23	1.39	10.29	*b* 65	3.19	3.46	10.2	*b* .968	*b* .212	29.201
	Sept.	23	3.2	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	*b* 10.7	.660	.193	29.136
	Aug.	19	3.4	21.93	70.11	72	5.87	3.67	8.01	38	*b* 3.92	*b* 4.27	8.1	.527	.135	*a*29.077
	Dec.	14	4.0	*a*13.59	*a*28.68	*b* 82	*a* 1.82	1.14	10.54	*b* 73	*b* 3.74	*b* 4.24	*b* 10.5	*b*1.000	*b* .236	29.072
Av.		13	3.4	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Typhoid Fever.	July	13	3.1	*a*23.58	*a*70.10	*b* 66	*a* 5.39	3.37	8.31	*b* 45	*b* 2.91	*b* 3.57	*b* 8.4	*b* .720	*b* .157	29.125
	Apr.	8	4.6	*a*19.90	*a*47.23	*b* 70	2.90	1.81	9.87	*b* 48	4.07	4.55	*b* 9.3	.925	*b* .152	29.125
	Jan.	8	4.1	15.24	19.01	80	1.19	.74	10.91	68	4.18	4.15	11.8	1.446	.316	29.014
	Feb.	5	5.3	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1 225	.266	*a*29.126
	Mar.	5	4.9	18.55	27.39	75	1.49	.93	10.75	*b* 48	4.10	4.65	12.2	.916	.238	29.119
	May	3	3.8	*a*22.41	*a*59.19	*b* 70	*a* 4.42	2.76	8.92	*b* 41	4.17	4.62	*b* 9.5	*b* .667	*b* .150	*a*29.135
	June	3	3.2	*a*24.11	*a*70.60	*b* 66	*a* 5.56	3.48	8.20	*b* 36	*b* 3.51	4.16	*b* 8.3	*b* .562	*b* .117	*a*29.184
Typho-Mal. Fever.																
More than Av. Per Ct of Typho-Mal. Fev.	Oct.	10	2.5	*a*18.64	*a*44.54	72	*a* 2.76	1.73	9.95	44	3.04	3.33	*b* 11.9	*b*1.039	*b* .241	29.152
	July	5	2.9	23.58	70 10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29.125
	Aug.	5	3.0	21.93	70.11	72	5.87	3.67	8.01	38	*b* 3.92	*b* 4.27	8.1	.527	.135	*a*29.077
	Sept.	5	2.3	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	*b* 10.7	.660	.193	29.136
Av.		4	3.2	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Typho-Mal. Fever.	Nov.	4	3.3	15.19	36.03	79	2.23	1.39	10.29	65	*b* 3.19	*b* 3.46	10.2	.968	.212	*a*29.201
	Apr.	3	4.2	*a*19.90	*a*47.23	*b* 70	2.90	1.81	9.87	*b* 48	4.07	4.55	*b* 9.3	.925	*b* .152	29.125
	Feb.	3	4.5	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	*a*29.126
	Mar.	2	5.0	18 55	27.39	75	1.49	.93	10.75	*b* 48	4.10	4.65	12.2	.916	.238	29.119
	Jan.	2	5.8	15.24	19.04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1.446	.316	29.044
	Dec.	1	2.5	13.59	28.68	82	1.82	1.14	10.54	73	3.74	4.24	10.5	1.000	.236	29.072
	May	1	2.5	*a*22.41	*a*59.49	*b* 70	*a* 4.42	2.76	8.92	*b* 44	4.17	4.62	*b* 9.5	*b* .667	*b* .150	*a*29 135
	June	0.3	2.0	*a*24.11	*a*70.60	*b* 66	*a* 5.56	3.48	8.20	*b* 36	*b* 3.51	4.16	*b* 8.3	*b* .562	*b* .117	*a*29.184

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks. see Exhibit X.

a An exception to Proposition 1, relating to Typhoid Fever and Typho-Malarial Fever, on page 133.

b An exception to Proposition 2, relating to Typhoid Fever and Typho-Malarial Fever, on page 133.

EXHIBIT XXIII.—MEASLES AND WHOOPING-COUGH.—*Stating for the Year and for each Month of the Year 1895, what Per Cent of the Weekly Reports of Sickness Stated Presence of Measles and Whooping-Cough and what were the Meteorological Conditions as Observed at Stations in Michigan.**

MEASLES.				Temperature, F.		Humidity of Air.§ Av. of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative, Scale of 10°.		Av. Velocity of Wind, Miles Per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F.		
Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.		Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present †, ‡.	Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute—Grains of Vapor in a Cubic Foot of Air.	Inhaled.‖	Exhaled in excess of that Inhaled.¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Range.		Average Pressure.
														Monthly and for Year.	Av. Daily, by 3 Daily Observations.**	
More than Av. Per Cent of Measles.	June..	8	2.9	24.11	70.60	66	5.56	3.48	8.20	36	3.51	b 4.16	8.3	.562	.117	29.184
	May..	7	2.4	22.41	59.49	70	4.42	2.76	8.92	44	b 4.17	b 4.62	9.5	.667	.150	29.135
	Apr...	6	3.1	19.90	47.23	70	a 2.90	1.81	9.87	48	b 4.07	b 4.55	9.3	b .925	.152	29.125
	Mar. .	5	3.0	a18.55	a27.39	b 75	a 1.49	.93	10.75	48	b 4.10	b 4.65	b 12.2	b .916	b .238	a29.119
Av.		4	3.1	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Measles.	Feb.	4	2.9	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	a29.126
	July	4	3.3	a23.58	a70.10	b 66	a 5.39	3.37	8.31	b 45	b 2.91	b 3.57	b 8.4	b .720	b .157	29 125
	Jan......	3	4.2	15.24	19.04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1.446	.316	29.044
	Dec.	3	2.8	13.59	28.68	82	1.82	1.14	10.54	73	3.74	4.24	10.5	1.000	.236	29.072
	Aug......	2	2.3	a21 93	a70.11	b 72	a 5.87	3.67	8.01	b 38	3.92	4.27	b 8.1	b .527	b .135	29.077
	Sept.....	2	5.3	a20.98	a65.92	b 72	a 5.37	3.36	8.32	b 38	b 3.14	b 3.49	10.7	b .660	b .193	a29 136
	Nov......	2	2.5	15.19	36.03	79	2.23	1.39	10.29	65	b 3.19	b 3.46	10.2	968	.212	a29.201
	Oct.	0.2	1.0	18 64	44.54	b 72	2.76	1.73	9.95	b 44	b 3.01	b 3.33	11.9	1.039	.241	a29.152
WHOOPING-COUGH.																
More than Av Pr. Ct of Whooping-Cough.	Jan.	15	2.5	a15.24	a19.04	b 80	a 1.19	.74	10.94	b 68	b 4.18	b 4.15	b 11.8	b1.446	b .316	a29 044
	July	12	2.2	23.58	70.10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29.125
	Feb.	11	2.9	a16.07	a17.27	b 78	a 1.17	.73	10.95	b 57	b 4.05	b 4.60	b 11.7	b1.225	b .266	29.126
Av.		9	2.6	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Whooping-cough.	Mar. ...	9	2.9	18 55	27.39	75	1.49	.93	10.75	b 48	4.10	4.65	12.2	.916	.238	29.119
	Apr......	9	3.5	a19.90	a47.23	b 70	2.90	1.81	9.87	b 48	4.07	4.55	b 9.3	.925	b .152	29.125
	June.....	9	2.0	a24.11	a70.60	b 66	a 5.56	3.48	8.20	b 26	b 3.51	4.16	b 8.3	b .562	b .117	a29.184
	Aug......	9	2.5	a21.93	a70.11	b 72	a 5.87	3.67	8.01	b 38	3.92	4.27	b 8.1	b .527	b .135	29 077
	Sept. ...	9	2.3	a20.98	a65.92	b 72	a 5.37	3.36	8.32	b 38	b 3.14	b 3.49	10.7	b .660	b .193	a29.136
	May.....	8	2.8	a22.41	a59 49	b 70	a 4.42	2.76	8.92	b 44	4.17	4.62	b 9.5	b .667	b .150	a29.135
	Dec.	8	2.0	13.59	28.68	82	1.82	1.14	10.54	73	3.74	4.24	10.5	1.000	.236	29.072
	Nov......	5	3.3	15.19	36.03	79	2.23	1.39	10.29	65	b 3.19	b 3.46	10.2	.968	.212	a29.201
	Oct.	4	3.1	18.64	44.54	b 72	2.76	1.73	9.95	b 44	b 3.01	b 3.33	11.9	1 039	.241	a29.152

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*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X.

a An exception to Proposition 1, relating to Measles and Whooping-Cough, on page 133.

b An exception to Proposition 2, relating to Measles and Whooping-Cough, on page 133.

EXHIBIT XXIV.—CHOLERA MORBUS AND DYSENTERY.—*Stating for the Year and for each Month of the Year 1895, what Per Cent of the Weekly Reports of Sickness Stated Presence of Cholera Morbus and Dysentery and what were the Meteorological Conditions as observed at Stations in Michigan.**

CHOLERA MORBUS.				Temperature, F.		Humidity of Air.§ Av. of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°.		Av. Velocity of Wind, Miles Per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F.		
														Range.		
Months in Order of Greatest Per Cent. of Weekly Reports Stating Presence of.		Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present.†, ‡	Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute — Grains of Vapor in a Cubic Foot of Air.	Inhaled ‖	Exhaled in excess of that Inhaled.¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Monthly and for Year.	Av. Daily, by 3 Daily Observations.**	Average Pressure.
More than Av. Pr Ct. of Cholera Morbus.	Sept.	38	2.8	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	*b* 10.7	.660	.193	29.136
	Aug.	37	2.8	21.93	70.11	72	5.87	3.67	8.01	38	*b* 3.92	*b* 4.27	8.1	.527	.135	*a*29.077
	July	30	2.7	23.58	70.10	66	5.39	3.37	8.31	45	2.91	3.57	8 4	.720	.157	29.125
	June	17	2.7	24.11	70.60	66	5.56	3.48	8.20	36	3.51	*b* 4.16	8.3	.562	.117	29.184
Av.		15	3.0	19.18	46 37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Cholera Morbus.	Oct.	14	2.8	18 64	44 54	*b* 72	2.76	1.73	9.95	*b* 44	*b* 3.04	*b* 3.33	11.9	1.039	.241	*a*29.152
	May	7	4.4	*a*22.41	*a*59.49	*b* 70	*a* 4.42	2.76	8.92	*b* 44	4.17	4.62	*b* 9.5	*b* .667	*b* .150	*a*29.135
	Feb.	6	4.3	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	*a*29.126
	Jan.	5	4.2	15.24	19.01	80	1.19	.74	10.94	68	4.18	4.15	11.8	1.446	.316	29.044
	Apr.	4	4.4	*a*19.90	*a*47.23	*b* 70	2.90	1.81	9.87	*b* 48	4.07	4.55	*b* 9.3	.925	*b* .152	29.125
	Nov.	4	3.0	15.19	36.03	79	2.23	1.39	10.29	65	*b* 3.19	*b* 3.46	10.2	.968	.212	*a*29.201
	Dec.	4	3.8	13.59	28.68	82	1.82	1.14	10.54	73	3.74	4.24	10.5	1.000	.236	29 072
	Mar.	3	4.4	18.55	27.39	75	1.49	.93	10.75	*b*48	4.10	4.65	12.2	.916	.238	29.119
DYSENTERY.																
More than Av. Per Cent of Dysentery.	Aug.	42	2.8	21.93	70.11	72	5.87	3.67	8.01	38	*b* 3.92	*b* 4.27	8.1	.527	.135	*a*29.077
	Sept.	38	2.8	20.98	65.92	72	5.37	3.36	8.32	38	3.14	3.49	*b* 10.7	.660	.193	29.136
	July	27	3.1	23.58	70.10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29.125
	Oct	25	2.9	*a*18.64	*b*44.54	72	*a* 2.76	1.73	9.95	44	3.04	3.33	*b* 11.9	*b*1.039	*b* .241	29.152
Av.		15	3.2	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Av. Per Cent of Dysentery	June	9	3.3	*a*24.11	*a*70.60	*b* 66	*a* 5.56	3.48	8.20	*b* 36	*b* 3.51	4.16	*b* 8.3	*b* 5.62	*b* .117	*a*29.184
	Feb.	7	4.9	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	*a*29.126
	Nov.	6	3.7	15.19	36.03	79	2.23	1.39	10.29	65	*b* 3.19	*b* 3.46	10.2	.968	.212	*a*29 201
	Jan.	5	4.7	15.24	19.04	80	1.19	.74	10.94	68	4.18	4.15	11.8	1.446	.316	29.044
	Apr.	5	3.5	*a*19 90	*a*47.23	*b* 70	2.90	1.81	9.87	*b* 48	4.07	4.55	*b* 9.3	.925	*b* .152	29.125
	May	5	3.4	*a*22.41	*a*59.49	*b* 70	*a* 4.42	2.76	8.92	*b* 44	4.17	4.62	*b* 9.5	*b* .667	*b* .150	*a*29 135
	Mar.	4	4.3	18.55	27.39	75	1.49	.93	10.75	*b* 48	4.10	4.65	12.2	.916	.238	29.119
	Dec.	2	3.3	13.59	28.68	82	1.82	1.14	10.54	73	3.74	4.24	10.5	1.000	.236	29.072

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X.

a An exception to Proposition 1, relating to Cholera Morbus and Dysentery, on page 133.

b An exception to Proposition 2, relating to Cholera Morbus and Dysentery, on page 133.

COLD-WEATHER DISEASES.

EXHIBIT XXV.—*Summary relative to Propositions contained in Exhibits X., XII., XIV., XV., XVI., etc. (pages 121–145), concerning Relations by Months, in 1895, between Greater or Less than Usual Prevalence of Diseases Named, and Certain given Coincident Climatic Conditions.*

Diseases.	Months (inclusive) in which Diseases named were more than Usually Prevalent in 1895.	Months (inclusive) in which Diseases named were less than Usually Prevalent in 1895.	For the 12 months of the year 1895. Number of Months in which Propositions hold true *										
			That in Months when Diseases named were more than usually prevalent the conditions named below were Greater than usual, and in Months when Less than usually prevalent these conditions were Less than usual †							That in Mos. when Diseases named were more than usually prevalent the conditions named below were Lower than usual, and in Mos. when the Diseases were Less than usually prevalent these conditions were higher than usual.†			
			Relative Humidity.	Av. Per. Cent of Cloudiness.	Ozone.		Velocity of Wind.	Atmospheric Pressure. Range.		Average Temperture.	Av. Daily Range of Temp.†	Av. Daily Atmospheric Pressure.†	Absolute Humidity.
					Day.	Night.		Monthly.	Av. Daily.				
Bronchitis	Jan.-May	June-Dec.	8	7	10	9	7	8	7	7	7	8	8
Pneumonia	Jan.-Apr., Dec.	May-Nov.	10	9	10	9	9	10	9	9	9	10	10
Croup, membran.	Feb., Apr.	Jan.-Mar., May-Dec.	7	8	7	6	6	7	6	6	6	7	7
Diphtheria	Jan., Feb., Oct., Nov.	Mar.-Sept., Dec.	10	10	5	4	9	9	10	10	10	6	9
Tonsillitis	Jan.-May, Nov., Dec.	June Oct.	10	9	10	9	8	10	9	9	9	8	10
Influenza	Jan.-May, Dec.	June-Nov.	9	8	11	10	8	9	8	8	8	9	9
Scarlet fever	Jan., Mar.-May, Oct.-Dec.	Feb., June-Sept.	8	7	8	7	8	10	9	9	9	8	10
Rheumatism	Feb.-May, Nov.	Jan., June-Oct., Dec.	8	7	8	7	6	8	7	7	7	6	8
Neuralgia	Jan.-June	July-Dec.	7	6	9	10	6	7	6	6	6	7	7
Consumption, pul.	Jan.-Apr., June	May, July-Dec.	9	7	8	9	7	8	7	7	7	8	8
Pleuritis	Jan.-Apr., Dec.	May-Nov.	10	9	10	9	9	10	9	9	9	10	10
Average disease	Feb.-Apr.	Jan., May-Dec.	8	7	8	7	7	8	7	7	7	8	8

*The figures in each of these 11 columns show for how many months out of the twelve months in 1895, the proposition named over the column holds true thus, concerning bronchitis, the proposition relative to average daily range of temperature held true in seven months out of the twelve; that relative to average temperature, in seven out of twelve, etc.

†The statements relative to the average daily range of temperature and the average daily pressure of the atmosphere were taken from Proposition 1 and inserted in Proposition 2 in the statistical study of sickness in Michigan in 1893, Annual Report for 1894. These propositions are printed on pages 118 and 119 of this Report.

WARM-WEATHER DISEASES.

EXHIBIT XXVI.—*Summary Relative to Propositions contained in Exhibits XIX., XXI., etc., (pages 134–140, etc.), concerning Relations, by Months in 1895, between Greater or Less than Usual Prevalence of Diseases Named, and Certain given Coincident Climatic Conditions.*

Diseases.	Months (inclusive) in which Diseases named were more than Usually Prevalent in 1895.	Months (inclusive) in which Diseases named were less than Usually Prevalent in 1895.	For the 12 Months of the Year 1895. Number of Months in which Propositions hold true.*										
			That in Months when Diseases named were More Prevalent than Usual the Conditions named below were Higher than Usual, and in Months when the Diseases were less Prevalent than Usual these Conditions were lower than Usual.				That in Months when Diseases named were More Prevalent than Usual the Conditions named below were less than Usual, and in Months when the Diseases were less Prevalent than Usual these Conditions were Greater than Usual.						
							Atmospheric Pressure. Range.				Ozone.		
			Average Temperature.	Av. Daily Range of Temp.	Absolute Humidity.	Av. Daily Atmospheric Pressure.	Monthly.	Av. Daily.	Relative Humidity.	Av. per Cent of Cloudiness.	Day.	Night.	Velocity of Wind.
Diarrhea	June-Oct.	Jan.-May, Nov , Dec.	9	9	10	8	10	9	10	9	10	9	8
Cholera infantum	June-Oct.	Jan.-May, Nov. Dec	9	9	10	8	10	9	10	9	10	9	8
Fever, intermittent	June-Oct.	Jan -May, Nov., Dec.	9	9	10	8	10	9	10	9	10	9	8
Fever, remittent	June, July, Sept.-Dec.	Jan.-May, Aug.	6	6	7	9	7	6	7	6	11	10	6
Fev., typhoid (ent)	Aug.-Dec.	Jan.-July	5	5	6	7	6	5	6	5	8	9	5
Fever, typho-mal.	July-Oct.	Jan.-June, Nov., Dec	8	8	9	7	9	8	9	8	9	10	7
Measles	Mar.-June	Jan., Feb , July-Dec.	8	8	7	7	7	8	7	8	5	4	9
Whooping-cough	Jan , Feb., July	Mar.-June, Aug.-Dec.	5	5	6	6	6	5	4	3	6	7	6
Cholera morbus	June-Sept.	Jan.-May, Oct.-Dec.	10	10	11	7	11	10	9	8	9	8	9
Dysentery	July-Oct.	Jan.-June, Nov., Dec.	8	8	9	7	9	8	9	8	9	10	7

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*The figures in each of these 11 columns show for how many months out of the twelve months in 1895, the proposition named over the column holds true; thus, concerning diarrhea, the proposition relative to average daily range of temperature held true in nine months out of the twelve; that relative to absolute humidity ten months out of the twelve, etc.

TOTAL SICKNESS—AVERAGE DISEASE.

"Average disease" is an average of the tabulated diseases reported present on all the cards received and compiled at this office during the year. It is probably equivalent to the actual sickness from all diseases printed on the report cards, and probably represents very nearly the average sickness from all the diseases in the State. A sample of the report cards on which diseases are reported to this office is found on page 81. Twenty-eight diseases are printed on the cards. In 1895 there were 4,394 of these card reports received. On some of the cards only one or two diseases were reported present; on others twenty or more were reported present. Had each disease (printed on this card, and only the twenty-eight thus named) been reported present on every card received at this office, there would have been 123,032 reports of diseases present. (This is the product of 4,394 reports received multiplied by 28, the number of diseases printed on the cards, or 100 per cent of the possible disease reports.) There were actually present on the cards received at this office only 24,004 disease reports which 24,004÷123,032 of the possible disease reports that might have been present, is 20 per cent. This 20 per cent represents the actual sickness in the State from the tabulated diseases reported present, or in other words the sickness from "average disease." (See Diagram 4, page 131.)

Exhibit XXVII. serves to indicate the probable actual sickness in the State from the tabulated diseases in each year from 1877 to 1895. It compares the sickness in 1895 by months with the sickness by months in each of the eighteen years, 1877–1894. It also compares the sickness in 1895, by months with the sickness, by months, in each of the nine years, 1886–1894. This last comparison is made because of the change in the plan of reports, which occurred in May, 1885, since which time the plan has been to have reported only the sickness actually observed by the physician who reports. Previous to May, 1885, some reported sickness that, by conference with other physicians, they believed to have occurred. Since May, 1885, the subject is placed upon a scientific basis.

By Exhibit XXVII., it will be seen that the sickness reported in 1895, was, for the year, and for each month of the year, considerably less than the average reported for the eighteen years, 1877–94. That exhibit also shows that the sickness reported in Michigan for the year 1895, and for each month was less than the average for the nine years, 1886–1894.

On this subject Exhibits A and B, on pages 110 and 111, and the accompanying remarks, may be studied in connection with the exhibits and remarks in this part of this article. In Exhibit A., the order of prevalence of each disease, including the "Average Disease," is shown as it appears after taking account of the order of prevalence of each disease in the places where it was present, and also the per cent of all reports received on which that disease was reported.

RELATIONS OF TOTAL AMOUNT OF SICKNESS TO METEOROLOGICAL CONDITIONS.

PROPOSITION 1.—That in months when **more** than the average per cent of weekly reports stated the presence of such of the 28 diseases tabulated (in tables on pages 95–109) as were reported present, the relative humidity of the atmosphere, the average per cent of cloudiness, the ozone, the average velocity of the wind, the monthly and the average daily range of the barometer, were **greater** than the average for the year;

and in months when **less** than the average per cent of reports stated the presence of said diseases those conditions were **less** than the average for the year. In Exhibit XXVIII., page 145, the letter *a* marks exceptions to this proposition for the year 1895.

EXHIBIT XXVII.—SICKNESS FROM AVERAGE DISEASE, 1877–95.—*By Year and Months for each of the nineteen Years, 1877–95, Stating on an average for such of the 28 diseases tabulated as were reported present, what Per Cent of the Weekly Reports received stated presence of the Diseases, and comparing the Average Per Cents for Months in 1895, with the Averages for Corresponding Months in the Years 1877–94; also comparing the Averages for the Months in 1895 with the Averages for corresponding months in the nine Years, 1886–1894.**

Years, etc.	Annual Av.	January.	February.	March.	April.	May.	June.	July.	August.	September.	October.	November.	December.
Average 18 years, 1877–94	27	28	28	28	27	26	25	26	29	29	28	26	26
Average 9 years, 1886–94	23	24	24	25	24	23	21	22	25	25	23	22	23
1877	28	27	28	26	24	24	23	26	29	31	30	30	30
1878	30	30	30	31	29	28	26	28	32	35	34	30	32
1879	33	35	36	36	35	30	30	32	37	36	34	34	33
1880	32	32	32	32	31	30	31	34	36	35	32	30	31
1881	33	34	34	32	35	31	30	34	37	36	35	32	31
1882	30	31	30	30	30	29	28	28	30	34	32	31	29
1883	30	30	31	33	33	31	29	29	32	32	29	29	28
1884	29	28	29	30	28	28	29	31	34	34	33	30	29
1885	26	29	29	30	28	25	24	26	27	27	26	26	26
1886	26	26	26	28	27	26	23	26	27	28	25	25	25
1887	25	26	27	28	26	25	24	27	29	26	25	24	24
1888	24	24	26	27	26	24	23	22	25	25	23	22	23
1889	23	23	22	24	23	23	21	24	27	28	26	23	22
1890	25	26	26	25	26	25	23	24	27	26	25	25	27
1891	25	27	27	27	27	25	22	23	26	25	24	23	24
1892	21	26	25	24	24	20	19	19	22	23	22	20	23
1893	20	21	21	20	20	19	18	18	21	21	20	20	20
1894	20	20	19	20	20	19	18	18	20	22	20	19	19
1895 (Diagram 4, page 131)	20	20	21	22	22	19	18	19	20	19	19	17	18
In 1895 Less than Average 1877-94	7	8	7	6	5	7	7	7	9	10	9	9	8
In 1895 Less than Average 1886 94*	3	4	3	3	2	4	3	3	5	6	4	5	5

* This last comparison is made because of the change in the plan of making the reports, which occurred in May, 1885, as explained on page 80.

PROPOSITION 2.—That in months when **more** than the average per cent of weekly reports stated the presence of such of the twenty-eight diseases tabulated as were reported present, the average daily temperature, the average daily range of temperature*, the absolute humidity of the atmosphere, and the average daily pressure of the atmosphere*, were **less** than the average for the year; and in months when **less** than the average per cent of reports stated the presence of said diseases those conditions were **greater** than the average for the year. In Exhibit XXVIII., shown below, the letter *b* marks exceptions to this proposition for the year 1895.

What per cent of the weekly reports received in 1895 (on an average for such of the tabulated diseases as were reported present) stated presence of the diseases is graphically represented by months in Diagram 4, page 131.

Exhibit XXVIII., continued for a series of years, should show what meteorological conditions are on the whole most conducive to health in Michigan, and what are most to be guarded against by residents of Michigan.

EXHIBIT XXVIII.—AVERAGE DISEASE.—*Stating for the Year and for each Month of the Year 1895, what Per Cent of the Weekly Reports of Sickness Stated Presence of Average Disease and what were the Meteorological Conditions as observed at Stations in Michigan.**

AVERAGE DISEASE.				Temperature, F.		Humidity of Air.§ Av. of 3 Daily Observations.		Vapor Inhaled and Exhaled from the Air Passages by one Person in 24 Hours, Troy Ounces.		Average Per Cent of Cloudiness.	Ozone, Relative. Scale of 10°.		Av. Velocity of Wind, Miles per Hour by Anemometer.	Atmospheric Pressure, Inches. Reduced to 32° F.		
Months in Order of Greatest Per Cent of Weekly Reports Stating Presence of.		Per Cent of Weekly Reports Stating Presence of.	Av. Order of Prevalence where Present.†, ‡.	Av. Daily Range by Registering Thermometers.	Average of Three Daily Observations.	Relative Per Cent of Saturation.	Absolute — Grains of Vapor in a Cubic Foot of Air.	Inhaled.‖	Exhaled in excess of that Inhaled.¶		Day Observation, 7 A. M. to 2 P. M.	Night Observation, 9 P. M. to 7 A. M.		Range.		Average Pressure.
														Monthly and for Year.	Av. Daily, by 3 Daily Observations.**	
More than Av. Per Ct. of Av. Disease.	Mar.	22	3.5	18.55	27.39	75	1.49	.93	10.75	*a* 48	4.10	4.65	12.2	.916	.238	29.119
	Apr.	22	3.4	*b*19.90	*b*47.23	*a* 70	2.90	1.81	9.87	*a* 48	4.07	4.55	*a* 9.3	.925	*a* 1.52	29.125
	Feb.	21	3.3	16.07	17.27	78	1.17	.73	10.95	57	4.05	4.60	11.7	1.225	.266	*b*29.126
Av.		20	3.0	19.18	46.37	74	3.35	2.09	9.59	50	3.67	4.09	10.2	.888	.201	29.125
Less than Average Per Cent of Average Disease.	Jan.....	20	3.1	*b*15.24	*b*19.04	*a* 80	*b* 1.19	.74	10.94	*a* 68	*a* 4.18	*a* 4.15	*a* 11.8	*a*1.446	*a* .316	*b*29.044
	Aug.....	20	3.0	21.93	70.11	72	5.87	3.67	8.01	38	*a* 3.92	*a* 4.27	8.1	.527	.135	*b*29.077
	May.....	19	2.8	22.41	59 49	70	4.42	2.76	8.92	44	*a* 4.17	*a* 4.62	9.5	.667	.150	29.135
	July.....	19	2.8	23.58	70.10	66	5.39	3.37	8.31	45	2.91	3.57	8.4	.720	.157	29.125
	Sept....	19	2.9	20.98	65 92	72	5.37	3.36	8.32	38	3.14	3.49	*a* 10.7	.660	.193	29 136
	Oct.....	19	2.7	*b*18.64	*b*44.54	72	*b* 2.76	1.73	9.95	44	3.04	3.33	*a* 11.9	*a*1.039	*a* .241	29.152
	Dec.....	18	3.0	*b*13.59	*b*28.68	*a* 82	*b* 1.82	1.14	10.54	*a* 73	*a* 3.74	*a* 4.24	*a* 10.5	*a*1.000	*a* .236	*b*29.072
	June.....	18	2.7	24.11	70.60	66	5.56	3.48	8.20	36	3.51	*a* 4.16	8.3	.562	.117	29 184
	Nov.....	17	2.7	*b*15.19	*b*36 03	*a* 79	*b* 2.23	1.39	10.29	*a* 65	3.19	3.46	10.2	*a* .968	*a* .212	29.201

*, †, ‡, §, ‖, ¶, **. For foot-notes with these marks, see Exhibit X.
a An exception to Proposition 1, relating to Average Disease, on page 119.
b An exception to Proposition 2, relating to Average Disease, on page 119.

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* The statements relative to the average daily range of temperature and the average daily pressure of the atmosphere were taken from Proposition 1 and inserted in Proposition 2 in the statistical study of sickness in Michigan in 1893, Annual Report for 1894.

COMMUNICABLE DISEASES IN MICHIGAN DURING THE YEAR ENDING DECEMBER 31, 1895.

COMPILED UNDER THE DIRECTION OF THE SECRETARY OF THE STATE BOARD OF HEALTH.

This paper continues a subject treated for the preceding year on pages 148–472 of the Report of the State Board of Health for the year 1895, and for former years in previous reports.

Whenever information is received at this Office of the outbreak (in any locality in Michigan) of diphtheria, scarlet fever, typhoid fever, consumption, small-pox, measles, German measles (rötheln), whooping-cough, rabies or glanders, a letter is sent to the health officer of the township, city or village in which the disease is reported to be present (if the name of the health officer has been reported to this Office; if not, to the president of the board of health), calling his attention (if the report was not received from him) to the reported existence of the disease within his territory, indicating his duties and powers and the proper measures to be taken in restricting the disease, transmitting documents of instruction with regard to prevention and restriction of the disease, for distribution among the neighbors of families in which the disease is present,* and asking for a report of the methods employed for the restriction of the disease, and the results of efforts for suppressing it, also the number of cases and deaths in each outbreak. In the case of typhoid fever, a printed letter was used (form [162.]) which is reproduced in Part I. of the Report of this Board for 1894, p. lxxxvi. In the case of measles a hektographed letter was used. In the case of diphtheria, scarlet fever, and small-pox the letter generally sent during the year 1894 was substantially the same as that printed on pages 251–252 of the Report of the State Board of Health for the year 1884, except that about a dozen questions were added. With this letter in each instance, there was sent a blank form (L) for the notice of the first case of

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* It is believed that these documents distributed in this manner are doing great good; for the neighbors of the sick are sufficiently alarmed to read the documents, and are thus led to co-operate in stamping out the disease.

Some evidence of the value of this work may been seen further on, in the several articles to which this is an introduction, in tables which show the estimated number of outbreaks of, and cases of sickness from communicable diseases prevented, and lives saved by isolation and disinfection.

In the Report of this Board for the year 1895 (pp. 153–174) in the introduction to the articles on the dangerous communicable diseases, are printed tables and diagrams which show the results of restrictive measures recommended by this Board. In this Report such a summary may be published following the series of papers on the several dangerous communicable diseases.

TABLE 1.—*Number of all places* in Michigan at which Communicable Diseases were reported present, also the number of new places† at which each disease was reported present each week in 1895.*

Weeks ending Saturday—		Diphtheria.		Scarlet Fever.		Typhoid Fever.		Measles.		Whooping-cough.		Consumption.		Small-pox.	
		* Places.	†New Places.	Places.	New Places.	Places.	New Places.	Places.	New Places.	Places.	New Places.	Places.	New Places.	Places.	New Places.
January	5	36	12	49	13	24	9	7	5	------	------	228	0	11	2
	12	32	10	61	29	29	12	7	0	------	------	228	0	10	2
	19	43	10	64	20	27	9	11	1	------	------	227	0	6	0
	26	41	14	60	17	26	10	14	11	------	------	227	7	7	2
February	2	29	8	58	21	24	3	11	2	------	------	227	21	8	0
	9	23	6	54	12	22	5	9	5	------	------	227	4	5	1
	16	16	5	53	21	13	2	6	1	------	------	226	2	5	0
	23	17	5	48	12	14	5	9	0	------	------	129	2	4	0
March	2	21	5	45	11	20	5	12	6	------	------	136	80	6	1
	9	26	14	43	16	16	9	11	4	------	------	148	22	4	0
	16	30	8	42	6	7	3	12	4	------	------	155	9	5	1
	23	30	12	38	13	8	2	15	5	------	------	155	2	5	1
	30	24	9	32	7	8	4	15	7	------	------	147	5	3	0
April	6	22	8	32	10	6	1	8	3	------	------	146	5	3	0
	13	27	11	35	9	11	4	17	7	------	------	148	1	2	0
	20	21	4	40	11	17	5	20	7	------	------	150	4	3	0
	27	20	7	38	15	11	2	17	6	------	------	141	2	2	1
May	4	20	5	36	13	10	4	20	6	------	------	143	4	2	0
	11	18	5	39	12	12	1	25	10	------	------	147	2	2	0
	18	13	5	37	7	12	3	20	4	------	------	154	11	3	0
	25	14	6	35	9	12	4	14	6	------	------	152	5	2	2
June	1	18	7	38	7	11	4	13	2	------	------	154	5	3	0
	8	21	6	40	12	12	3	15	6	------	------	153	4	3	0
	15	20	9	31	9	8	0	19	4	------	------	154	1	2	0
	22	18	8	31	7	15	7	19	6	------	------	165	8	2	0
	29	17	3	29	12	10	3	14	7	------	------	165	2	4	1
July	6	20	5	23	5	13	3	10	2	0	0	173	9	5	2
	13	19	7	26	11	24	13	9	2	11	0	170	2	3	1
	20	16	4	21	8	29	12	9	5	15	13	174	2	3	0
	27	17	3	28	8	33	13	10	1	14	3	173	4	2	0
August	3	17	5	23	9	42	14	5	6	13	3	178	13	2	0
	10	22	3	27	5	40	20	6	2	12	2	178	1	2	0
	17	20	11	19	10	43	12	8	3	14	5	180	3	2	0
	24	23	6	25	3	50	24	6	1	11	4	179	9	3	1
	31	22	7	28	8	51	33	3	1	12	2	180	5	4	1
September	7	21	7	25	8	58	25	7	2	10	3	180	2	4	0
	14	21	6	24	7	63	25	6	1	11	2	179	2	4	0
	21	18	8	28	10	65	23	5	4	12	4	179	4	5	2
	28	27	11	28	7	81	39	2	0	7	4	179	9	4	0
October	5	30	12	27	4	99	33	2	0	9	1	179	5	4	0
	12	31	13	26	5	122	29	2	2	11	3	179	3	2	0
	19	30	7	32	12	113	45	4	0	9	2	180	4	2	0
	26	41	13	31	5	113	33	2	1	5	4	181	6	3	1
November	2	41	23	33	8	106	28	5	0	8	0	182	1	3	1
	9	40	7	35	8	100	21	6	3	8	4	186	3	2	0
	16	35	9	37	9	88	21	6	2	9	3	186	2	2	1
	23	35	10	38	10	79	9	5	0	8	1	187	1	3	0
	30	34	9	30	6	72	6	5	1	9	1	188	4	3	1
December	7	33	8	31	11	61	10	8	2	8	3	187	1	3	1
	14	28	7	31	9	52	9	9	3	7	1	186	2	3	0
	21	31	6	34	10	48	10	8	0	10	2	186	2	2	0
	28	29	6	31	3	45	7	9	5	14	4	187	1	1	0
Average number of places per week.		26	8	36	10	40	12	10	3	10	2	173	6	4	0.5

* The number of "Places" are copied from the weekly bulletins "Health in Michigan" issued every Wednesday, and include *all* places at which the several diseases were reported present up to and including the Wednesday morning following the calendar week for which each bulletin is issued. Therefore they may really represent ten days, each week lapping over to near the middle of the next week. "New Places" are included in these numbers.

The numbers in the first column, "Places," are compiled from the data in card-reports for the sickness statistics, the outbreak reports of communicable diseases, and the weekly reports of communicable diseases.

† The "New Places" are those from which the specified diseases were first reported during the calendar week specified in each bulletin They are compiled from the same sources as are the numbers in the first column of this table and from newspaper reports. Neither of the columns of this table contains *all* the places at which, later, by the "final" and "annual" reports, the diseases were found to have been present.

a dangerous communicable disease, and a blank form (M) for weekly reports during the continuance of the disease. After the outbreak was over, there was sent a blank form (K) or (O) for special final report. Blanks (L) and (M) now in use are substantially the same as those printed on pages 253–254 of the Report for 1884. The blank (K) for final report is printed on pages xiii–xiv of the Report of this Board for 1888; but the present blank is more complete. The blank (O) is for typhoid fever, and was first used in September, 1890. Since that date it has been modified; as at present used it is as printed on pages 149–150 of the Report of this Board for 1895.

The information contained in the above-mentioned blanks and those supplied to health officers and clerks of townships, cities and villages, for their annual reports, when filled and returned to this Office by the health officers of localities where dangerous communicable diseases have existed, together with other correspondence in regard to outbreaks of such diseases, are the bases on which the various statements made in this article are founded.

It is probable that every case of small-pox is reported to the Secretary of the State Board of Health; but that cannot yet be said of any other of the diseases in Table 1. Named in the order of most complete reports, probably these communicable diseases would be arranged as follows: Small-pox, scarlet fever, diphtheria, typhoid fever, measles, consumption.

Some of the Purposes of this Compilation.

The object in having the data contained in the various reports received at the office of the Secretary compiled, tabulated and published is two-fold: First, that facts relative to the ways whereby dangerous communicable diseases are spread in Michigan, and how they are sometimes restricted, and other useful facts, may be submitted to the people of the State, knowledge of which, it is hoped, will enable them to avoid or combat such diseases; and second, by the collation of such data to aid in the progress of sanitary science, especially in as far as it bears on the study of the cause and prevention of dangerous communicable diseases in Michigan.

In furtherance of these objects, the attempt has been made in this as in previous Reports to publish useful information relative to dangerous communicable diseases in this State, on the following points:—(1) The diseases which cause the most sickness and deaths; (2) To what extent those diseases prevail; (3) The methods of introduction and spread of those diseases; (4) The period of incubation of each of those diseases; (5) The average duration of each disease after contraction; (6) The season of the year at which each of such diseases is most prevalent and likely to be contracted; (7) The age at which persons are most likely to contract each disease; (8) The age at which there is greatest danger of persons dying from each disease; (9) The comparative susceptibility of the sexes to contraction of each disease; (10) The localities in the State where each disease is known to be usually most prevalent; (11) Whether or not each disease is more prevalent in large centers of population than in the more sparsely populated rural districts; (12) The comparative mortality from each disease; (13) The death-rate and the sickness-rate from each disease; (14) The best measures for the prevention and for the restriction of each disease; (15) Results of efforts made for the prevention and restriction of each disease; (16) The usual vehicles of transmission in each disease; (17) The results of neglect of restrictive measures in outbreaks of each disease; and, (18) The efficacy of isolation and disinfection in each disease.

The increasingly large number of replies received in answer to communications relative to communicable diseases, the general desire manifested by health officers for documents on the restriction of those diseases, and the general care taken to send complete reports to this office, show an increasing interest among the people, and a commendable effort on the part of the local health authorities to have every means employed to prevent the spread of communicable diseases. The number of communications which annually pass to and from this office relative to dangerous communicable diseases, has increased greatly during the last few years.

Persistent efforts of this Board have been directed toward impressing the people of the State with the necessity of adopting restrictive measures,—isolation and disinfection, in outbreaks of communicable diseases.

As intimated above, these efforts have been productive, among the people and health officials of the State, of increased interest in sanitary progress; much, however, is still to be desired in that direction.

Definition of the Term "Outbreak," as Used in this Article.

For studying the influence of isolation and disinfection in restricting outbreaks of communicable diseases, an outbreak is considered as the existence of one or more cases of a particular communicable disease, within any health officer's jurisdiction, whether city, village, or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. Heretofore when a period of sixty days or over has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak has been considered ended. Possibly the sixty-day limit may be changed to ninety days; but in order to study the subject systematically, there must be a limit in time, as also in area.

DIPHTHERIA IN MICHIGAN.—YEAR ENDING DECEMBER 31, 1895.

During the year ending December 31, 1895, there were reported to the Secretary of the State Board of Health 401 outbreaks of diphtheria in 347 localities in Michigan, which resulted in 3,433 cases and 708 deaths. Nothwithstanding the marked improvement which the State Board of Health has succeeded in bringing about both in promptness and accuracy of reports of local health officials to the central office, it is still probable that not all cases of and deaths from diphtheria are yet reported. For the year 1895 there were reported to the Secretary of State 594 deaths from diphtheria, or 114 less than were reported to this Office; and the Secretary of the State Board of Health has estimated that the deaths reported to the Secretary of State should be increased by about 40 per cent to equal the actual number of deaths which occur; according to this estimate, there were about 832 deaths from diphtheria during 1895, in Michigan, instead of 708, as reported to the State Board of Health.

Diphtheria in 1895, Compared with Previous Years.

From year to year there has been a steady improvement, both in the methods adopted by the State Board of Health in securing and compiling reports, and in the efforts made by local health authorities throughout the State to furnish in their reports the information desired by the State Board. These facts, together with the constantly increasing population, make it difficult to determine the exact increase or decrease of prevalence of the disease in the State by comparison of the numbers of outbreaks of the disease, and the cases and deaths resulting therefrom; and these facts should be borne in mind in referring to Table 1. While the above-mentioned facts might reasonably be expected to produce a constant increase in the reported prevalence of the disease, Table 1 shows that such increase has not occurred. In 1890 there was a marked increase in the prevalence of the disease as compared with the previous two years; but since then, notwithstanding the causes above mentioned, no considerable increase has occurred; and in 1894 there is even shown a very decided decrease in both the prevalence of the disease and the fatality therefrom. As may be seen in Table 1, not only are the numbers of outbreaks, cases and deaths in 1895 *less* than in each of the previous five years, and less than the averages for the previous eleven years, but the fatality is 2.4 per cent less in 1895 than the average for the 11 years 1884–94.

TABLE 1.—DIPHTHERIA IN MICHIGAN.—*Numbers of Reported Outbreaks, Localities (in which they Occurred), Cases and Deaths; Average Numbers of Cases and Deaths Per Outbreak, and the Per Cent of Cases which proved fatal, as reported for each of the Fourteen Years, 1882-1895; also Averages of the same for the Eleven Years, 1884-94, and Comparisons of the Facts for 1895 with those for 1894 and with the Averages for the Eleven Years, 1884-94.*

Year.	Reported Outbreaks.	Reported Localities.	Reported Cases.	Average Cases per Outbreak.	Reported Deaths.	Average Deaths Per Outbreak.	Deaths Per 100 Cases.
1882	-----------	163	2,046	-----------	495	-----------	24.
1883*	-----------	125	2,246	-----------	543	-----------	24.
1884†	362	302	3,915	10.8	905	2.5	23.
1885	467	396	4,018	8.6	964	2.0	24.
1886	550	422	4,244	7.7	982	1.8	23.
1887	466	371	3,382	7.3	825	1.8	24.4
1888	337	283	2,228	6.6	532	1.6	23.9
1889	398	329	3,157	7.9	683	1.7	21.6
1890	442	365	4,206	9.5	1,050	2.4	25.
1891	535	461	4,385	8.2	1,002	1.9	22.8
1892	527	463	4,818	9.1	1,099	2.1	22.8
1893	546	460	4,736	8.7	1,092	2.0	23.1
1894	435	367	3,852	8.9	744	1.7	19.3
1895	401	347	3,433	8.6	708	1.8	20.6
Average for eleven years, 1884-1894	460	384	3,904	8.5	898	2.0	23.0
Variations in 1895 from 1894	— 34	— 20	—419	— .3	— 36	+ .1	+1.3
Variations in 1895 from the average for 11 years, 1884-94	— 59	— 37	—471	+ .1	—190	— .2	—2.4

* The use of the blank form "M" for weekly reports was begun in May, 1883.
† In compiling diphtheria the use of the annual reports of health officers was begun in 1884.

TABLE 2.—*Exhibiting the number of reported deaths from Diphtheria per 100,000 persons living in Michigan in each of the 28 years, 1868-95. Compiled from the Secretary of State's Vital Statistics of Michigan. (Population estimated for intercensal years, by average annual increase, by Dr. Wilbur, Chief of Vital Statistics in State Department, except for the year 1895 which was estimated in the Office of the State Board of Health.)*

Year.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876	1877.	1878.	1879.	1880.	1881.
Deaths	8.84	7.80	10.22	10.49	15.06	16.44	15.60	14.68	21.36	39.51	59.36	92.55	94.20	122.61
Year.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.
Deaths	81.93	56.76	58.53	56.50	58.45	47.78	35.81	41.40	60.46	49.54	46.67	43.50	28.64	26.07

The foregoing table (2) giving the number of deaths from diphtheria, per 100,000 persons living, reported to the Secretary of State, probably quite accurately represents the annual fluctuations of, but not the total deaths from diphtheria in Michigan during the 28 years, 1868-95. A diagram graphically representing Table 2, for the 26 years, 1868–93, can be seen on page 181 of the Report of this Board for 1895.

Distribution of Diphtheria by Divisions and Counties During 1895.

Table 3 exhibits the distribution of diphtheria in 1895, by divisions of the State; Table 4 and the accompanying map exhibit in slightly different ways, the reported diphtheria, by counties, during the year 1895. The tables exhibit the death-rates as well as the reported number of deaths. The map for 1895, exhibits by counties, the number of localities infected, the number of outbreaks which occurred, and the number of cases and deaths per 10,000 of population.

TABLE 3.—*Exhibiting the Population of Michigan for the year 1895, by tiers of counties (Upper Peninsula as one tier); also the number of cases of and deaths from Diphtheria* REPORTED *from each of the divisions for 1895, and the number of cases per 10,000 population of each division.*

Counties in Groups, most Northern ones First.		Estimated Population 1895.*	Reported Cases of Diphtheria, 1895.	Reported Cases per 10,000 of Population.	Reported Deaths from Diphtheria, 1895.	Reported Deaths per 10,000 of Population.
State		2,278,579	3,433	15.07	708	3.11
Upper Peninsula	Alger. Delta. Schoolcraft. Luce. Houghton. Ontonagon. Gogebic. Baraga. Mackinac. Chippewa. Keweenaw. Marquette. Iron. Menominee. Dickinson.	213,073	153	7.18	31	1.45
Eleventh tier of counties	Emmet. Charlevoix. Cheboygan. Presque Isle.	43,372	122	28.13	28	6.46
Tenth tier of counties	Leelenaw. Antrim. Otsego. Montmorency. Alpena.	48,721	50	10.26	4	.82
Ninth tier of counties	Benzie. G'd Traverse. Kalkaska. Crawford. Oscoda. Alcona.	42,933	106	24.69	23	5.36
Eighth tier of counties	Manistee. Wexford. Missaukee. Roscommon. Ogemaw. Iosco.	67,590	54	7.99	7	1.04
Seventh tier of counties	Mason. Lake. Osceola. Clare. Gladwin. Bay. Huron. Arenac.	157,735	409	25.93	78	4.94
Sixth tier of counties	Oceana. Newaygo. Mecosta. Isabella. Midland.	92,559	174	18.80	24	2.70
Fifth tier of counties	Muskegon. Montcalm. Gratiot. Saginaw. Tuscola. Sanilac.	250,905	238	9.49	33	1.32
Fourth tier of counties	Ottawa. Kent. Ionia. Clinton. Shiawassee. Genesee. Lapeer. St. Clair.	384,315	407	10.59	74	1.93
Third tier of counties	Allegan. Barry. Eaton. Ingham. Livingston. Oakland. Macomb.	231,765	124	5.35	31	1.34
Second tier of counties	Van Buren. Kalamazoo. Calhoun. Jackson. Washtenaw. Wayne.	514,449	1,388	26.98	341	6.63
First tier of counties	Berrien. Cass. St. Joseph. Branch. Hillsdale. Lenawee. Monroe.	231,167	208	9.00	34	1.47

* Population estimated by average annual increase, arithmetical method, based on U. S. Census of 1890 and the State Census of 1894, computed in the Office of the State Board of Health.

TABLE 4.—*Numbers of Cases and Deaths reported from Diphtheria per 10,000 persons living in each county in Michigan during the year 1895. (Compiled from reports of health officers, clerks, etc.)*

Counties.	* Estimated Population for 1895.	Number of reported		Number per 10,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.
State	2,278,579	3,433	708	15.07	3.11
Alcona	5,420	5	1	9.23	1.88
Alger	1,422	0	0	0	0
Allegan	39,246	21	10	5.35	2.55
Alpena	18,251	14	0	7.64	0
Antrim	12,931	0	0	0	0
Arenac	7,258	38	11	52.36	15.16
Baraga	4,531	1	0	2.21	0
Barry	23,678	32	7	13.51	2.96
Bay	62,527	120	22	19.19	3.52
Benzie	8,770	8	1	9.12	1.14
Berrien	46,723	64	11	13.68	2.35
Branch	26,061	34	11	13.05	4.22
Calhoun	48,465	83	16	17.12	3.30
Cass	21,232	1	0	.48	0
Charlevoix	11,464	0	0	0	0
Cheboygan	14,379	117	26	81.37	18.08
Chippewa	16,148	6	1	3.72	.62
Clare	8,081	41	8	50.74	.99
Clinton	26,200	17	2	6.49	.76
Crawford	2,647	2	0	7.56	0
Delta	20,245	9	2	4.45	.99
Dickinson	14,887	9	2	6.05	1.34
Eaton	32,749	16	5	4.89	1.53
Emmet	11,312	0	0	0	0
Genesee	40,834	15	1	3.67	.25
Gladwin	5,073	0	0	0	0
Gogebic	14,312	8	2	5.59	1.40
G'd Traverse	18,555	90	21	48.50	11.32
Gratiot	28,803	12	0	4.17	0
Hillsdale	30,175	31	3	10.27	.99
Houghton	46,338	48	11	10.36	2.37
Huron	33,184	187	35	56.35	10.55
Ingham	40,195	11	3	2.74	.75
Ionia	35,325	9	0	2.55	0
Iosco	11,619	1	0	.87	0
Iron	5,360	0	0	0	0
Isabella	22,103	16	4	7.24	1.81
Jackson	46,911	76	18	16.21	3.84
Kalamazoo	42,752	109	9	25.50	2.11
Kalkaska	5,760	1	0	1.73	0
Kent	124,942	205	40	16.41	3.20
Keweenaw	2,783	2	0	7.19	0
Lake	5,745	2	0	3.48	0
Lapeer	28,795	20	10	6.94	3.47
Leelanau	9,938	12	1	12.07	1.01
Lenawee	48,564	31	4	6.38	.82
Livingston	20,332	19	4	9.34	1.97
Luce	2,321	3	2	12.93	8.62
Mackinac	7,089	0	0	0	0
Macomb	32,531	7	2	2.15	.62
Manistee	26,585	31	5	11.66	1.88
Marquette	38,490	6	2	1.56	.52
Mason	18,931	8	0	4.23	0
Mecosta	20,987	3	1	1.43	.48
Menominee	24,041	61	9	25.37	3.74
Midland	13,858	139	15	100.30	10.82
Missaukee	7,432	0	0	0	0
Monroe	33,392	16	4	4.80	1.20
Montcalm	34,538	3	1	.87	.29
Montmorency	2,676	1	0	3.74	0
Muskegon	36,652	5	2	1.36	.55
Newaygo	18,787	4	0	2.13	0
Oakland	43,034	18	0	4.46	0
Oceana	16,824	12	4	7.13	2.38
Ogemaw	5,652	0	0	0	0
Ontonagon	7,652	0	0	0	0
Osceola	16,936	13	2	7.68	1.18
Oscoda	1,781	0	0	0	0
Otsego	4,925	23	3	46.70	6.09
Ottawa	40,014	65	8	16.24	2.00
Presque Isle	6,217	5	2	8.04	3.22
Roscommon	1,562	1	0	6.40	0
Saginaw	81,740	106	16	12.97	1.96
Sanilac	34,284	39	9	11.38	2.63
Schoolcraft	7,454	0	0	0	0
Shiawassee	33,330	31	1	9.30	.30
St. Clair	54,875	45	12	8.20	2.19
St. Joseph	25,020	31	1	12.39	.40
Tuscola	34,888	73	5	20.93	1.43
Van Buren	31,189	39	11	12.50	3.53
Washtenaw	43,834	15	1	3.42	.23
Wayne	301,298	1,066	286	35.38	9.49
Wexford	14,739	21	2	14.25	1.36

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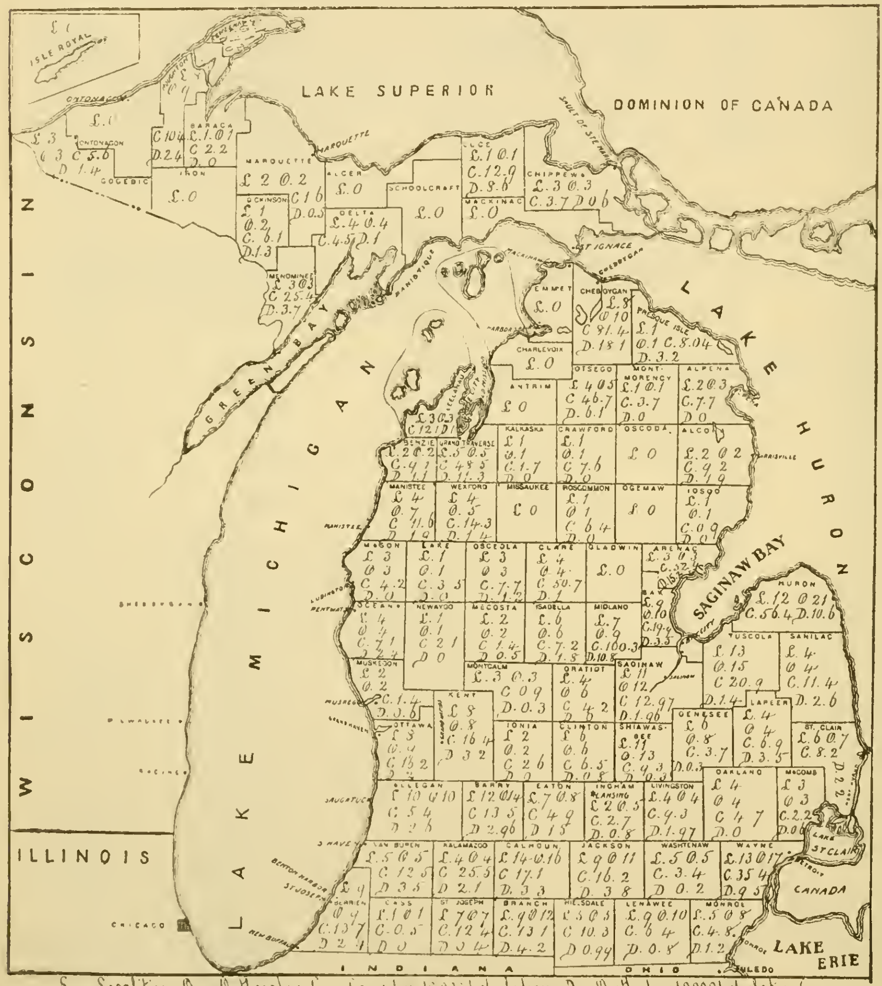
* Population estimated by average annual increase, arithmetical method, based on U. S. Census of 1890 and the State Census of 1894; computed in the Office of the State Board of Health.

DISTRIBUTION OF DIPHTHERIA IN MICHIGAN IN 1895.

BY COUNTIES, THE REPORTED CASES AND DEATHS PER 10,000 INHABITANTS.



L. Localities, O Outbreaks; C Cases per 10,000 population; D Deaths per 10,000 population.

[PLATE 5:6]

The percentages shown on the above map do not exactly agree in some instances with the percentages in the table (4), as but one decimal place could be used on the map, while in the table the percentages are carried out to the second decimal place.

Sickness-rates from Diphtheria in 1895.

Table 3 exhibits the latitudinal distribution of diphtheria throughout the State, by tiers of counties; all the counties of the Upper Peninsula considered as one tier. By this table (3), it appears that the lowest sickness-rate (5.35 per 10,000 of population) was in the third tier of counties; and that the Upper Peninsular tier was next in lowest sickness-rate, it being 7.18 per 10,000 of population. The tier of counties having the greatest sickness-rate (28.13 per 10,000 of population) was the eleventh. Other tiers in which the sickness-rates were largely above the average, were the second with 26.98, the seventh with 25.93, and the ninth with 24.69 cases per 10,000 of population.

The sickness-rate in the second tier of counties, as may be seen in the table, was 26.98 cases per 10,000 of population. In the city of Detroit, situated in this tier, the rate was 37.08 per 10,000,* and in the tier, excluding Detroit, the rate was only 17.43 per 10,000. In the fourth tier of counties, in which is situated the city of Grand Rapids, the sickness-rate per 10,000 of population, was 10.59 cases. In the city of Grand Rapids the rate was 24.50,* and in the tier of counties, excluding Grand Rapids, it was 6.93 cases per 10,000 of population.

Table 4 shows that the sickness-rate from this disease, for the year, for the whole State, was 15.07 cases per 10,000 of estimated population.

Table 4 shows also that the greatest sickness-rate from this disease in 1895, was in Midland county, where the ratio of cases to population was 100.3 to 10,000. Other counties where the sickness-rates were largely in excess of the average rate for the State, were Cheboygan, 81.37; Huron, 56.35; Arenac, 52.36; Clare, 50.74; Grand Traverse, 48.50, and Otsego, 46.70 cases per 10,000 of population. The lowest sickness-rate for the year, .48 of one case per 10,000 of population, was in Cass county. Other counties where the sickness-rates were much *below* the average for the State, were: Iosco and Montcalm each .87; Muskegon, 1.36; Mecosta, 1.43, and Kalkaska, 1.73 cases per 10,000 of population.

Death-rates from Diphtheria in 1895.

The last columns of Tables 3 and 4 supply data showing the death-rates from diphtheria by divisions, and for each county in the State. By these tables it may be seen that the death-rate for the whole State per 10,000 inhabitants was 3.11.

Table 3 shows the greatest death-rates to have been in the eleventh and the second tiers of counties.

Table 4 shows that the greatest death-rate from this disease during the year (18.08 deaths per 10,000 of population) was in Cheboygan county. Other counties where the death-rates were much above the average death-rate for the State, were: Arenac, 15.16; Grand Traverse, 11.32; Midland, 10.82, and Huron, 10.55. The lowest death-rate in counties where deaths occurred, .23 of one death per 10,000 of population, was in Washtenaw county. Other counties where the death-rates were far *below* the average death-rate for the State, were: Genesee, .25; Montcalm, .29, and Shiawassee, .30 of one death per 10,000 of population. From the following twelve counties: Alger, Antrim, Charlevoix, Emmet, Gladwin, Iron, Mackinac, Missaukee, Ogemaw, Ontonagon, Oscoda, and Schoolcraft,—having an aggregate population of 84,874, no diphtheria was reported during the year. From Alpena, Baraga, Cass, Crawford, Gratiot, Ionia, Iosco, Kalkaska, Kewenaw, Lake, Mason, Montmorency, Newaygo, Oakland, and Roscommon counties, there was an aggregate of seventy-seven cases of diphtheria reported, with no deaths.

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* The reports of the city boards of health of Detroit and Grand Rapids state the populations of these cities for the year 1895, as 250,000 and 80,000, and the cases of sickness from diphtheria as 927 and 196 respectively, and these numbers are used in making the above calculations.

The proportionate fatality or "case mortality" from diphtheria in 1895, *i. e.*, the proportion of reported cases which proved fatal, was, for the whole State, 20.6 per cent or about one death to 4.85 cases. Much depends upon whether or not the mild cases are reported. According to the reports, the maximum fatality (66.7 per cent of reported cases) occurred in Luce county. Other localities where the fatality was much *greater* than the average for the State, were: Lapeer, 50; Allegan, 46.62; Muskegon and Presque Isle, each 40 per cent of reported cases. The minimum fatality (3.2 per cent of reported cases) occurred alike in Shiawassee and St. Joseph counties. Other counties where the fatality was considerably *less* than the average for the State, were: Genesee and Washtenaw each 6.7; Tuscola, 6.8, and Kalamazoo, 8.3 per cent of reported cases.

Diphtheria in Each Month of the Year, 1895.

TABLE 5.—*Exhibiting the reported numbers of outbreaks of Diphtheria which Began, the numbers which Ended, and the numbers which were Present, in each Month of the Year 1895, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Outbreaks began	74	26	34	22	16	19	18	22	38	40	38	32	379
Outbreaks ended	15	22	24	28	24	20	10	22	17	30	39	51	302
Outbreaks present	75	70	81	72	61	56	53	64	77	96	102	93	--------

The last line of figures in Table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. There may be a time during the outbreak when no cases are present, but if the subsequent cases can be attributed to infection from the preceding ones, it is called one outbreak. Frequently the beginning of an outbreak is reported but the end of the outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months. There were 77 more beginnings than endings of outbreaks reported during the year 1895.

TABLE 6.—*Exhibiting the Number and Per Cent of Cases of Diphtheria present in Michigan in each Month during the Year 1895. (Includes each case for which, the time during which it existed, was stated in the reports. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.)*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number cases present	376	279	245	201	210	186	187	202	284	482	591	572
Per cent of cases present	9.9	7.3	6.4	5.3	5.5	4.9	4.9	5.3	7.4	12.6	15.5	15.0

Source of Contagium of Diphtheria, and How the Disease is Spread.

Of the 3,433 cases of diphtheria reported, during the year 1895, as exhibited in the following table, the local health officers reported the source of contagium as follows:—Traced to a former case, 568; traced to cases of "sore throat," etc., 4; due to infection from "clothing," etc., 3; attributed to unsanitary conditions, 24; from outside jurisdiction, 49; probably from outside jurisdiction, 9; unknown, 2,412; not reportedor in definitely reported, 364; total, 3,433.

TABLE 7.—*Reported Source of Contagium of Cases of Diphtheria, in 1895.*

Traced to a former case	568
Traced to cases of "sore throat," "tonsillitis," and "membranous croup"	4
Due to infection from "clothing," "old rags," etc.	3
Alleged unsanitary conditions	24
Contagium reported as from outside jurisdiction	49
Contagium reported as probably from outside jurisdiction	9
Unknown or reports not definite (includes those reported "Contagium," "Sporadic," "Spontaneous," "*De Novo*," etc.)	2,412
Not reported	364
All cases	3,433

Cases Traced to a Preceding Case.

Table 7, shows that of the 3,433 reported cases of diphtheria, in the State in 1895, 568 were reported as traced to preceding cases of the disease. The following are extracts from a few of the reports in which health officers so reported:

"From a neighbor's child"—*H. A. Fortuin, M. D., Overisal township, Allegan county.*

"Patient was nursing diphtheria cases in Harper Hospital, Detroit; came home to Flint, and consulted a physician."—*Noah Bates, M. D., Flint city, Genesee county.*

"From a brother."—*C. W. Harris, M. D., Hillsdale city, Hillsdale county.*

"The source of contagium was from the patient (Dr. H. S. W—n.) attending diphtheria cases in the village of Elkton, and his patient coughing into his face while he was using a swab in same patient's throat."—*J. W. Snell, H. O., Fair Haven township, Huron county.*

"A large percentage from direct contagium."—*N. T. Langlois, M. D., Wyandotte city, Wayne county.*

"Direct contagium from cases in Greenwood township."—*V. F. Huntley, M. D., Manton village, Wexford county.*

Outbreaks Traced to Preceding Outbreaks.

The following table (8) and map, "Movement of Contagium of Diphtheria," show the sources and places to which diphtheria was spread in Michigan, where the contagium was reported by health officers to have been introduced into their jurisdictions from localities outside the State, or from other jurisdictions within the State.

TABLE 8.—*First, second and third localities, where the second locality was infected with Diphtheria from the first, and the third was infected from the second; and the numbers of cases and deaths from Diphtheria in the first, second and third localities, with the dates of the beginning and ending of each outbreak.* (*Compiled from reports of health officers who were able to trace the source of contagium to other localities.*)

Number.*	First Localities from which Diphtheria was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
1	Bay county: Merritt township	†	----	Tuscola county: Gilford township (Sept. 29-Feb. 15)	42	3	Tuscola county: Denmark township (Oct. 10-Oct. 28.)	1	0
2	Bay county	----	----	Genesee county: Flint township (Sept. 2-Sept. 15.)	1	0			
3	Branch county: Coldwater township (Oct. 1-Oct. 6.	1	1	Branch county: Bronson township (Oct 22-Dec. 6.)	3	0			
4	Branch county: Mattison township (June 21-Sept. 6.)	4	2	Branch county: Bronson village (Oct. 6—.)	1	0	Branch county: Kinderhook twp. (Oct. 10-Oct. 20.)	4	2
5	Calhoun county: Tekonsha village (Aug. 9—.)	2	2	Calhoun county: Clarendon township (Aug. 13—.)	1	0			
6	Cheboygan county: Cheboygan city (Jan. 4-Jan. 11, '96.)	61	16	Cheboygan county: Munro township (Apr. 27-May 20.)	5	0			
7	Cheboygan county: Inverness township (July-Nov.)	6	1	Presque Isle county: Case township	5	2			
8	Cheboygan county: Mentor township	†	----	Cheboygan county: Nunda township (Sept. 20-Feb.,'96.)	23	6			
9	Clare county: Redding township (Jan.-Sept.)	25	4	Clare county: Winterfield twp. (Feb.-Mar.)	6	2	Osceola county: Marion township (Feb. 20-Apr. 15.)	6	1
				Gratiot county: Seville township (Oct. 7-Oct. 20.)	2	0			
				Osceola county: Middle Branch twp. (May 1-June 10.)	2	0			
10	Eaton county: Windsor township (Nov. 14-Nov. 22.)	3	1	Ingham county: Lansing city (Nov. 14-Dec. 25.)	3	2	Eaton county: Windsor township (Nov. 14-Nov. 22.)	3	1
11	Genesee county: Montrose township	†	----	Shiawassee county: New Haven twp. (Nov. 27-Dec.)	2	0			
12	Gladwin county	----	----	Clare county: Surrey township (Jan. 13-July 19.)	9	2			
13	Houghton county: Calumet township (Jan.-Dec. 28.)	25	6	Houghton county: Hancock village (July 6-Nov. 16.)	4	3			

*The consecutive numbers in this column refer to similar consecutive numbers before quotations in the text following this table.

†Diphtheria was not reported to this office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

TABLE 8.—CONTINUED.—*Movement of Infection of Diphtheria.*

Number.*	First Localities from which Diphtheria was spread. Localities.	Cases.	Deaths.	Second Localities infected from First. Localities.	Cases.	Deaths.	Third Localities infected from Second. Localities.	Cases.	Deaths.
14	Huron county: Oliver township (Mar.)	6	1	Huron county: Fair Haven township (Mar. 14-May 12.)	6	0	Alpena county: Alpena city (Jan. 20-July —.)	6	0
							Huron county: Caseville township (May 1-June 22.)	5	1
15	Huron county: Sebewaing village	†	----	Huron county: Caseville township (Feb. 2—.)	1	0			
16	Huron county: Winsor township (Jan. 15-Oct. 10)	25	3	Huron county: Caseville township (July 11-Aug. 15.)	3	0			
17	Isoco county: Au Sable city	†	----	Huron county: Paris township (Oct.-June, 1896.)	130	27	Huron county: Sigel township (May 14-June 3.)	5	1
							Sanilac county: Minden township (Oct. 12-Dec. 10.)	26	7
18	Isabella county: Fremont township (Dec. 1-Dec. 26.)	6	1	Isabella county: Denver township (Dec. 4-Dec. 15.)	2	1			
19	Jackson county: Jackson city	36	8	Jackson county: Henrietta township (Oct. 9-Apr. 9. 1896.)	29	7			
				Leoni township (Dec. 18-Jan. 17, '96.)	5	2			
20	Kalamazoo county: Kalamazoo city (Jan. 4-Jan. 6, 1896.)	101	8	Allegan county: Watson township (Nov. 17-Dec. 1.)	1	0			
				Kalamazoo county: Brady township (Oct. 10-Oct. 17.)	1	0			
				St. Joseph county: Constantine twp. (Mar. 15-Mar. 24.)	1	0			
21	Kent county: Grand Rapids city (Jan.-Dec.)	196	38	Allegan county: Salem township (Apr. 25-May 10.)	3	3	Allegan county: Dorr township (June 1-June 28.)	6	4
				Kent county: Byron township (Jan. 6-Jan. 15)	1	0			
				Ottawa county: Georgetown twp. (Nov. 23-Nov. 30.)	1	0			
22	Lenawee county: Seneca township (Sept. 28-Jan., 1896.)	7	1	Hillsdale county: Cambria township (Nov. 5-Nov. 20.)	1	0			
23	Manistee county: Brown township	1	0	Manistee county: Manistee city (Nov. 9-Dec. 31)	7	0			
24	Manistee county: Manistee township (Sept. 10-Dec. 19.)	19	4	Manistee county: Manistee city (Dec. 11-Dec. 25.)	1	0			
25	Mason county: Pere Marquette twp	†	----	Mason county: Ludington city (Sept. 27 Oct. 15)	1	0			
26	Midland county: Warren township (Sept. 20-May, 1896.)	38	9	Midland county: Geneva township (Oct. 16-Jan. 30, '96.)	14	3			

* † These foot-notes are printed at the bottom of the first page of this table.

TABLE 8.—CONTINUED.—*Movement of Infection of Diphtheria.*

Number.*	First Localities from which Diphtheria was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
27	Monroe county: Frenchtown twp.	†	----	Monroe county: Raisinville township (Apr. 8-Apr. 10.)	1	1	Monroe county: Monroe city	1	0
28	Oakland county: Holly village	†	----	Lapeer county: Lapeer city (Oct. 28-Dec. 28.)	7	4			
29	Oakland county: Novi township (Mar. 14-Apr. 18.)	2	0	Wayne county: Northville village (Apr. 9-Apr. 27.)	3	1			
30	Oceana county: Shelby village (Dec. 18-Jan. 1, 1896.)	1	1	Oceana county: Shelby township (Dec. 28-Jan. 4,'96.)	1	1			
31	Oscoda county: Big Creek township	†	----	Roscommon county: Roscommon village (Jan. 21-Feb. 4.)	1	0			
32	Saginaw county: Swan Creek township (Dec.14,'94-Jan.18,'95.)	----	----	Saginaw county: Fremont township (Jan. —.)	8	0			
33	Shiawassee county: Owosso city (Nov. 25-Dec. 7.)	3	0	Shiawassee county: Laingsburg village (Dec.-Dec.)	3	0			
				Sciota township (Nov. 27-Jan. —.)	4	0			
34	Owosso city (Jan. 16-Apr. 15.)	4	0	Woodhull township (Mar. 26-Apr. 6.)	1	0			
35	St. Clair county: Port Huron city (Jan. 3-Jan. 4, 1896.)	20	4	St. Clair county: Kenockee township (Mar. 14-Apr. 8.)	2	0			
36	Wayne county: Detroit city (Jan.-Dec. 31.)	927	255	Genesee county: Flint city (Sept. 23-Oct. 15.)	1	0			
				Huron county: Port Austin twp. (Oct. 23-Dec. 15.)	5	3			
				Macomb county: New Haven village (Jan. 3-Feb. 19.)	4	1			
				Wayne county: Hamtramck twp. (June 29-Nov. 25.)	8	3			
				Redford township (Sept. 2-Oct. 2.)	1	0			
				Springwells township (Mar. 10-Nov. 15.)	10	1			
37	Wexford county: Greenwood township (July 3-July 15.)	8	1	Wexford county: Manton village (July 2—.)	3	1			

*† These foot-notes are printed at the bottom of the first page of this table.

TABLE 8.—CONTINUED.—*Movement of infection of Diphtheria* Into Michigan *from outside the State.*

Number.*	First Localities from which Diphtheria was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
38	Alabama	----	----	Keweenaw county: Eagle Harbor twp. (Dec. 15-Dec. 26.)	2	0			
39	Canada	----	----	Eaton county: Delta township (Mar. 9-Mar. 30.)	4	3			
40	Chicago	----	----	Allegan county: Casco township (Dec. —.)	5	0			
				Jackson county: Norvell township (Aug. 18-Sept. 1.)	1	0	Lenawee county: Adrian city (Aug. 22-Sept. 29.)	5	0
				St. Joseph county: Flowerfield township (Apr. 12-May 5.)	1	0			
				Lockport township (Apr. 12-May 5.)	1	0			
				Van Buren county: South Haven village (Sept. 29-Oct. 14.)	7	1			
41	Florida	----	----	G'd Traverse county: Traverse City (Jan. 11-Nov. 6.)	21	9	G'd Traverse county: Traverse township (Feb. 10-Mar. 14.)	2	2
42	Illinois: Morris	----	----	Calhoun county: Bedford township (Dec. 20-Dec. 31.)	2	0			
43	Indiana: Hammond	----	----	Shiawassee county: Perry township (Dec. 24-Jan. 10,'96.)	2	0			
44	Indiana: Mishawaka	----	----	Cass county: Penn township (Aug. 12-Sept. 2.)	1	0			
45	New Jersey: Newark	----	----	St. Clair county: St. Clair city (Sept. 1-Nov. 9.)	6	2			
	Probable *Movement of Infection of Diphtheria.*								
46	Barry county: Assyria township (Aug. 6-Aug. 27.)	2	1	Calhoun county: Pennfield township (Dec. 21-Dec. 23.)	1	1			
47	Barry county: Barry township	†	----	Barry county: Hastings city (Aug. 24-Jan. 26.)	3	1			
48	Barry county: Irving township (Jan. —.)	2	0	Barry county: Thornapple twp. (Jan. 4-Jan. 25.)	1	0			
49	Branch county: Coldwater township (Sept.-Oct. 26.)	1	0	Shiawassee county: Owosso township (Sept. 19-Oct. 1.)	1	0			
50	Calhoun county: Marshall city	†	----	Calhoun county: Marengo township (May 6-June —.)	1	0			
51	Cheboygan county: Cheboygan city (Jan. 4-Jan. 1, 1896.)	61	16	Cheboygan county: Benton township (Sept. 28-Dec. 15.)	5	0			

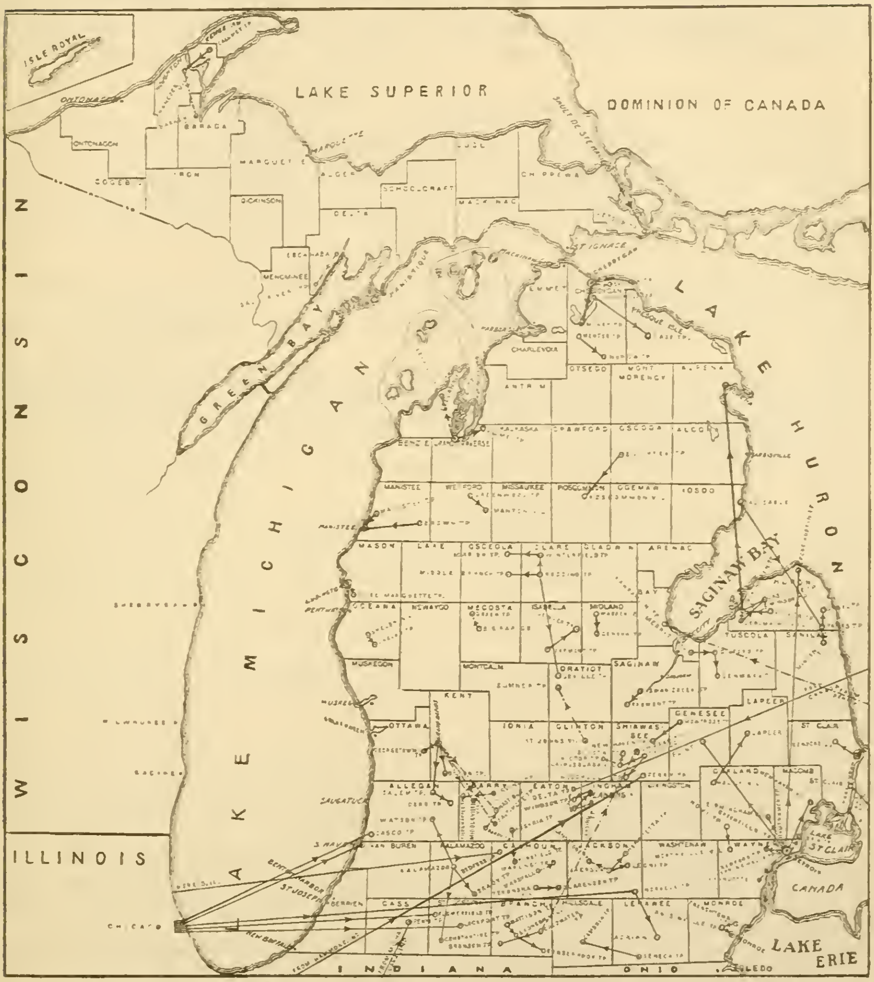
* † These foot-notes are printed at the bottom of the first page of this table.

TABLE 8.—Concluded.—**Probable** *Movement of Infection of Diphtheria.*

Number.*	First Localities from which Diphtheria was spread			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
52	Chippewa county: Sault Ste. Marie (Nov. 19-Dec. 3.)	3	1	Chippewa county: Detour township (Dec. 4-Dec. 13.)	2	0			
53	Clinton county: St. Johns village (Oct.-Dec. 3)	4	1	Gratiot county: Sumner township (Oct. 4-Nov. 4.)	5	0			
54	Delta county: Escanaba city (July 16-July 25.)	1	1	Delta county: Ford River township (Nov. 12-Dec. 8.)	1	0			
55	Eaton county: Windsor township (Nov. 14-Nov. 22.)	3	1	Ingham county: Lansing township (Dec. 8 —.)	1	0			
56	Grand Traverse county: Traverse city (Jan. 11-Nov. 6.)	21	9	G'd Traverse county: Acme township (Dec. 18 Jan. 5, '96.)	3	0			
				Leelanaw county: Leland township (Oct.-Oct. 23.)	1	1			
57	Houghton county: Calumet township (Jan.-Dec. 28.)	25	6	Baraga county: Baraga village (July 20-Aug. 12.)	1	0			
58	Huron county: Oliver township (Sept. —.)	2	0	Huron county: Fair Haven township (Sept.-Oct. 25)	9	2			
59	Huron county: Sebewaing	†	----	Huron county: Fair Haven township (June 11-July 8.)	8	1			
60	Jackson county: Jackson city (Sept. 10-Jan. 17, '96)	36	8	Jackson county: Sandstone township. (Nov. 10—.)	2	2			
61	Kent county: Grand Rapids city	196	38	Barry county: Baltimore township. (Oct.-Nov.)	2	0			
				Middleville village (June 3-June 9.)	1	1			
62	Mecosta county: Big Rapids city	1	1	Mecosta county: Green township (Jan. 13-Feb. 2.)	2	0			
63	Shiawassee county: Laingsburg village	3	0	Clinton county: Victor township (Jan. 13-Feb. 2.)	2	0			
64	Wayne county: Detroit city (Jan.-Dec. 31.)	927	229	Macomb county: Erin township (May 9-May 12.)	1	1			
				Oakland county: Birmingham village. (Aug. 5-Aug. 12.)	1	0			
				Wayne county: Greenfield township. (July 24-Aug. —.)	4	2			
				Hamtramck twp. (Apr. 18-May 2.)	6	0			
				Wyandotte city (Nov. 14 Jan. 6.)	4	0			
65	Pennsylvania	----	----	Bay county: Kawkawlin township (Dec. 15-Jan. 14.)	5	0			

* † These foot-notes are printed at the bottom of the first page of this table.

MOVEMENTS OF CONTAGIUM OF DIPHTHERIA IN 1895.



THIS MAP ILLUSTRATES TABLE 8. LINES CONNECT THE LOCALITIES INFECTED. THE ARROWHEADS INDICATE THE DIRECTIONS OF THE MOVEMENTS.

[PLATE 868]

Definitely traced. Probably traced.

MOVEMENTS OF DIPHTHERIA CONTAGIUM IN MICHIGAN IN 1895.

On the accompanying map, the spread of diphtheria in Michigan, in the year 1895, as reported to this Office, is shown by black lines which connect the localities; the arrow-heads indicate in each instance the direction of the movement. The source of this information is given in the list of "extracts from reports of health officers" (beginning on this page), with the name and address of each health officer who traced the source of contagium to some place outside of his jurisdiction. These quotations concerning the spread of contagium from first to second, and even third localities are arranged in the same order as the "First Localities" in Table 8, thus giving the source of each report. The consecutive numbers placed before these quotations refer to similar numbers in the first column of Table 8 of this article.

Extracts from Reports of Health Officers.

The following quotations are in answer to the question on the final report "The source of contagium, and the mode of introduction, etc.":—

1. "Exposed in school by a pupil in Bay county."—*Francis Dawson, Sr., Gilford township, Tuscola county.*

1. "From Gilford."—*Geo. Reid, M. D., Denmark township,* Tuscola county.*

2. "A. E. M—n had an uncle living in Bay county; went there visiting and contracted the disease."—*Thos. H. Nesbitt, H. O., Flint township, Genesee county.*

3. "From State Public School at Coldwater."—*Henry P. Mowry, M. D., Bronson township, Branch county.*

4. "The patient's little sister died of the disease in Mattison township five weeks and two days before the patient came down. The premises were thoroughly disinfected as soon as the child was buried. We think the patient took the disease from the same source as that one."—*Jno. E. Outwater, M. D., Bronson village, Branch county.*

4. "Patients contracted the disease at Bronson."—*C. H. Lewis, M. D., Kinderhook township,* Branch county.*

5. "The disease was brought from Tekonsha."—*Joseph E. Daniels, H. O., Clarendon township, Calhoun county.*

6. "Brought from the city of Cheboygan."—*Samuel R. Tucker, H. O., Munro township, Cheboygan county.*

7. "From family visiting relatives at Mullet Lake, Cheboygan county."—*Joseph Jarves, Clerk, Chase township, Presque Isle county.*

8. "A family who had the diphtheria last season in the township of Mentor did not fumigate, and came here. The school teacher boarded with them and took the disease."—*Amos Briggs, H. O., Nunda township, Cheboygan county.*

9. "From Town of Temple [Redding township], Clare county."—*E. W. Chapman, Clerk, Winterfield township. Clare county.*

9. "Family named P—y, moved from Winterfield township, Clare county, after exposure to diphtheria in the township, was not quarantined until after two deaths occurred."—*Donald Johnson, M. D., Marion township,* Osceola county.*

9. "Imported from Temple, Clare county."—*Chas. McLachlan, M. D., Seville township, Gratiot county.*

9. "One E. T—n, caught the diphtheria near Temple, Clare county, came to her home in this township, and gave the disease to one other person in the same house."—*Clifford M. Dunham, H. O., Middle Branch township, Osceola county.*

10. "A Mrs. D. M—n, from Dimondale [Windsor township], Mich., visited the city with her five-year-old child, which was taken sick with diphtheria."—*Theo. Cole, M. D., Lansing city, Ingham county.*

10. "From the city of Lansing where a fatal case of diphtheria occurred, from exposure to this case."—*Tyler Hull, M D., Windsor township,* Eaton county.*

11. "Came from Montrose township, Genesee county."—*John A. Judson, M. D., New Haven township, Shiawassee county.*

12. "From cases coming from Gladwin county."—*Louis L. Keeley, M. D., Surrey township, Clare county.*

13. "From Calumet, Mich."—*J. E. Scallon, M. D., Hancock village, Houghton county.*

14. "The source of contagium was from the patient, Dr. H. S. Watson, attending diphtheria cases in the village of Elkton [Oliver township]."—*J. W. Snell, H. O., Fair Haven township, Huron county.*

14. "From Huron county—Bay Port."—*James Eakins, M. D., Alpena city,* Alpena county.*

14. "From Bay Port."—*H. Johnson, M. D., Caseville township,* Huron county.*

15. "From Sebewaing."—*H. Johnson, M. D., Caseville township, Huron county.*

16. "From township of Winsor."—*H. Johnson, M. D., Caseville township, Huron county.*

17. "Was brought from Au Sable, Iosco county."—*August Abraham, H. O., Paris township, Huron county.*

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* See "Third locality" column of Table 8.

17. "From Paris township."—*Chas. Fuller, Sigel township, Huron county.*

17. "From Paris township, Huron county."—*F. E. Durning, Clerk, Minden township,* Sanilac county.*

18. "The patients having the disease were exposed to the disease in Fremont township, this county."—*Geo. W. Thorpe, H. O., Denver township, Isabella county.*

19. "Brought from Jackson."—*J. R. Hogue, M. D., Henrietta township, Jackson county.*

19. "Articles were sent from a family in Jackson city who had just recovered from diphtheria."—*Chas. H. Haskin, M. D., Leoni township, Jackson county.*

20. "Contracted in Kalamazoo."—*S. P. Albertson, H. O., Watson township, Allegan county.*

20. "Patient was visiting in Kalamazoo and was taken sick soon after his return."—*Chas. H. McKain, M. D., Brady township, Kalamazoo county.*

20. "Brought from Kalamazoo."—*B. P. Scoville, M. D., Constantine township, St. Joseph county.*

21. "From Grand Rapids."—*Adam Newell, Clerk, Salem township, Allegan county.*

21. "Four children came from Grand Rapids, Mich., to Salem township, three of these died of diphtheria, within two miles of this family, two weeks before."—*V. V. Bacon, M. D., Dorr township,* Allegan county.*

21. "Brought by patient from Grand Rapids."—*Samuel Tobey, H. O., Byron township, Kent county.*

21. "From Grand Rapids."—*M. L. Weston, M. D., Georgetown township, Ottawa county.*

22. "The person having the diphtheria came from Seneca, Lenawee county."—*Chas. E. Payne, M. D., Cambria township, Hillsdale county.*

23. "The first case came from township of Brown."—*J. Kinsley, M. D., Manistee city, Manistee county.*

24. "From East Lake [Manistee township]"—*J. Kinsley, M. D., Manistee city, Manistee county.*

25. "From Pere Marquette township."—*E. N. Dundas, M. D., Ludington city, Mason county.*

26. "From Warren township, by visiting relatives sick from same disease."—*C. V. High, M. D., Geneva township, Midland county.*

27. "From Frenchtown."—*John S. Knapp, H. O., Raisinville township, Monroe county.*

27. "From Raisinville."—*Louis C. Knapp, M. D., Monroe city,* Monroe county.*

28. "A patient came here from Holly, Mich., to Home for Feeble Minded, and forty-eight hours after malignant diphtheria developed."—*J. V. Frazier, M. D., Lapeer city, Lapeer county.*

29. "From Novi, Oakland county."—*P. E. White, M. D., Northville village, Wayne county.*

30. "Visited at Shelby village, and contracted the disease."—*A. M. Spaulding, M. D., Shelby township, Oceana county.*

31. "This young man was working in camp near Luzerne [Bay Creek township], Oscoda county; was taken sick there and came here for treatment for sore throat."—*James A. Fraser, M. D., Roscommon village, Roscommon county.*

32. "From Swan Creek."—*H. S. Dixson, H. O., Fremont township, Saginaw county.*

33. "A girl, four years old, was brought here from Owosso, with diphtheria; her mother had just died of membranous croup."—*C. N. Freeman, M. D., Laingsburg village, Shiawassee county.*

33. "From Owosso."—*C. N. Freeman, M. D., Sciota township, Shiawassee county.*

34. "Contracted in Owosso."—*Geo. W. Chrouch, M. D., Woodhull township, Shiawassee county.*

35. "She was residing as a domestic in Port Huron and came home sick with the disease."—*Henry Isbister, H. O., Kenockee township, St. Clair county.*

36. "Patient was nursing diphtheria cases in Harper Hospital, Detroit. Came home to Flint and consulted a physician."—*Noah Bates, M. D., Flint city, Genesee county.*

36. "F. G—i, brought the infection, in clothing of her sister, from Detroit."—*E. B. Gibson, M. D., Port Austin township, Huron county.*

36. "Brought from city of Detroit by a relative."—*Alexander Gunn, M. D., New Haven village, Macomb county.*

36. "First child was taken sick while visiting relatives in the city [Detroit] in the neighborhood where epidemic occurred in spring."—*A. Stewart, M. D., Hamtramck township, Wayne county.*

36. "Contracted in Detroit."—*T. W. Shields, M. D., Redford township, Wayne county.*

36. "One case from exposure to diphtheria in Detroit."—*Fred J. Clippert, M. D., Springwells township, Wayne county.*

37. "Direct contagium from cases in Greenwood township."—*V. F. Huntley, M. D., Manton village, Wexford county.*

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*See "Third locality" column of Table 8.

Outbreaks of Diphtheria in Michigan Traced to Preceding Cases Outside of the State.

38. "She contracted the disease in Fruithurst, Alabama, and never properly disinfected their furniture at that place, and as soon as the furniture arrived the outbreak occurred."—*Wesley Clark, H. O., Eagle Harbor township, Keweenaw county.*

39. "Brought in by direct contagium, by people from Canada."—*Jno. W. Dunn, H. O., Delta township, Eaton county.*

40. "From Chicago."—*S. Galbreath, H. O., Casco township, Allegan county.*

40. "Mrs. F—l came from Chicago with her two children visiting, and one began having sore throat before going on to Adrian, where, after a short time, it was pronounced diphtheria and others took it." —*Duncan Hyndman, M. D., Norvell township, Jackson county.*

40. "Child first taken sick had been visiting at Norvell, Jackson county, and came here sick."—*F. E. Andrews, M. D., Adrian city,* Lenawee county.*

40. "The lady Mrs. S—l while in Chicago was sent to the hospital as she was suffering with measles, and thinks she was exposed to diphtheria while there."—*W. C. Thompson, M. D., Flowerfield township, St. Joseph county.*

40. "Dr. B—r, practicing in Chicago, contracted same [diphtheria] while attending a child sick with diphtheria and came by M. C. R. R. to Three Rivers and I immediately quarantined."—*A. W. Scidmore, M. D., Lockport township, St. Joseph county.*

40. "From books and clothing sent from Chicago, from a house where diphtheria prevailed a year ago; said to have been disinfected."—*M E. Bishop, M. D., South Haven village, Van Buren county.*

41. "A child was brought here from Florida with the disease. It was pronounced a scrofulous sore throat and no precautions taken."—*Chas. J Kneeland, M. D., Traverse City, Grand Traverse county.*

42. "Contracted at Morris, Illinois, his home, and came here on a visit."—*C. C. Smith, M. D., Bedford township, Calhoun county.*

43. "Brought from Hammond, Ind., by Prof. W. Hill, on a visit to his parents."—*H. P. Holstead, M. D., Perry township, Shiawassee county.*

44. "From Mishawaka, Indiana, where the lady had been visiting."—*J. M. Wright, M. D., Penn township, Cass county.*

45. "Family moved into city from Newark, New Jersey, child taken sick two days after arrival."—*Wm. E. Burtless, M. D., St. Clair city, St. Clair county.*

Outbreaks of Diphtheria Probably Traced to Former Outbreaks.

46. "There was diphtheria across the road in the township of Assyria [Barry county], in the month of Sept. I understand the house was disinfected, but do not know."—*Philip Bowers, H. O., Pennfield township, Calhoun county.*

47. "Was exposed while visiting in Freeport [Barry township], fourteen miles north of Hastings."—*C. H. Barber, M. D., Hastings city, Barry county.*

48. "Supposed to have been contracted in the township of Irving, Barry county."—*Geo. W. Matteson, M. D., Thornapple township, Barry county.*

49. "Supposed it came from Coldwater."—*J. E. Van Hoten, H. O., Owosso township, Shiawassee county.*

50. "Supposed to be from the city of Marshall, where the children were attending school."—*Wm. N. Case, M. D., Marengo township, Calhoun county.*

51. "Not certain, supposed to have come from the city of Cheboygan as the girl had been in the city four days before taken sick."—*Thos. H. McKervey, H. O., Benton township, Cheboygan county.*

52. "Probably from a case at Sault Ste. Marie."—*W. B. House, M. D., Detour township, Chippewa county.*

53. "First case supposed to have been brought from St. Johns or vicinity."—*F. J. Graham, M. D., Sumner township, Gratiot county.*

54. "She moved into our township from Escanaba on Nov. 10, and was taken sick on the 12th."—*O. E. Nelson, H. O., Ford River township, Delta county.*

55. "I cannot tell how it was contracted; she came from township of Windsor."—*Norman V. Goodnoe, H. O., Lansing township, Ingham county.*

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*See "Third locality" column of Table 8.

56. "The doctor thinks first case was taken by the party calling on friends in Traverse city, who were just coming down with it."—*John A. Scripture, H. O., Acme township, Grand Traverse county.*

56. "Think they caught it at Traverse City where they were one week before they came down."—*John Dalton, H. O., Leeland township, Leelanaw county.*

57. "The family came from Calumet, Houghton county, in June, 1895; do not know whether there was any diphtheria at Calumet."—*Richard Fevre, H. O., Baraga village, Baraga county.*

58. "Supposed to have come from Oliver township."—*J. W. Snell, H. O., Fair Haven township, Huron county.*

59. "First case is supposed to have come from Sebewaing, although that case was called membranous croup."—*J. W. Snell, H. O., Fair Haven township, Huron county.*

60. "The source of contagium is not known to me; the supposition is that the disease was contracted in the city of Jackson."—*C. D. Hubbard, M. D., Sandstone township, Jackson county.*

61. "Thought to have come from Grand Rapids."—*F. G. Sheffield, M. D., Baltimore township, Barry county.*

61. "Supposed to have been contracted in the city of Grand Rapids."—*G. W. Matteson, M. D., Middleville village, Barry county.*

62. "Big Rapids as near as I can learn."—*N. R. Bradley, M. D., Green township, Mecosta county.*

63. "Supposed to be from visiting in Laingsburg."—*C. E. Hollister, H. O., Victor township, Clinton county.*

64. "Think he contracted the disease in the city of Detroit as he went there daily with milk."—*Jas. Yates, M. D., Erin township, Macomb county.*

64. "Supposedly from Detroit."—*N. Johnson, M. D., Birmingham village, Oakland county.*

64. "Supposed to have been contracted in Detroit."—*J. S. Dohany, M. D., Greenfield township, Wayne county.*

64. "All the children sick in this outbreak were attending school in the city where they evidently contracted the disease."—*A. Stewart, M. D., Hamtramck township, Wayne county.*

64. "Probably from Detroit."—*N. T. Langlois, M. D., Wyandotte city, Wayne county.*

65. "Supposed to have been brought in here by a family from Pennsylvania."—*Christian Ott, H. O., Kawkawlin township, Bay county.*

Outbreaks of Diphtheria Traced to Cases of "Sore Throat."

The following reports of health officers show how diphtheria was spread under the mistaken diagnosis of "sore throat":—

"Caught from sore throat."—*W. H. Johnson, Clerk, Gun Plains, Allegan county.*

"A child was brought here from Florida with the disease. It was pronounced a scrofulous sore throat, and no precautions taken."—*Chas. J. Kneeland, M. D., Traverse City, Grand Traverse county.*

Outbreaks of Diphtheria Attributed to Unsanitary Conditions.

The following are some representative statements of health officers who attributed outbreaks of diphtheria in their jurisdiction to unsanitary conditions, with the name of the health officer and his jurisdiction subjoined:—

"Too much decaying vegetation."—*E. C. Warren, M. D., Lincoln township, Arenac county.*

"Three [cases] from old manure, two from bad water."—*John Schannenk, H. O., Inverness township, Cheboygan county.*

"Very probably from a filthy privy vault, it was in a horrible condition."—*F. H. Callow, M. D., Genesee township, Genesee county.*

"Was from filth located under the house."—*C. F. Niblack, M. D., Reading village, Hillsdale county.*

"From bad water and surroundings."—*Thos. Whitfield, H. O., Austin township, Sanilac county.*

"Bad and filthy well water."—*N. S. Taylor, H. O., Geneva township, Van Buren county.*

Diphtheria in Au Gres township, Arenac county, Attributed to Unsanitary Conditions.

In reply to a letter from the Secretary of this Board relative to the prevalence of diphtheria in the township of Au Gres, Arenac county, Dr. Robert L. Evans, health officer of that jurisdiction wrote to this Office, Jan. 17, 1895, as follows:—

"In reply to yours of the 18th ult., permit me to say that the most vigorous actions to prevent the spread of diphtheria have been practiced by me since I was appointed health officer of Au Gres township, but the most strenuous endeavors on my part have resulted in a complete failure. I have questioned myself as to what causes diphtheria to break out when the water in Duck Lake is lowered by the heat of the summer sun. When everyone is free from the disease it will manifest itself. Why is it? These questions led me to believe that the foul gasses arising from the land surrounding said lake (when the water subsided) was the sole cause of diphtheria and I cannot tell, or even conjecture, how such a disease could make its appearance without some cause at a certain season of the year.

"Had I neglected my duty as a health officer and not compelled the nurses to *bury* everything that passed from the patient, then I would know the cause of an outbreak; but all these restrictions will not prevent an outbreak of diphtheria.

"Two years ago a farmer in this township plowed a certain piece of land on the 25th of October; the day being warm, he took his oldest child (aged 5 years) with him. In the evening the child complained of sore throat; the next morning I was called in to see her and pronounced it diphtheria. On the following day the second child was taken down with the disease, and on the third day the third child was prostrated. I asked the father of the children if any of the neighbors had been to the house; he said that no one had visited them for some time, and that his children had not been to any of the neighbors' houses. He then stated that the ground he plowed near Duck Lake on the 25th of October was very sour and asked me if I thought the stench from the ground would be the cause of his child's sickness. I told him that I could not help thinking so, as there were no cases of diphtheria in the township at that time. I mention this case to show my reasons for thinking that the disease arose from putrid ground. The next case of diphtheria that occurs in my jurisdiction will be fully investigated."

In reply to the above-quoted letter from Dr. Evans the Secretary of this Board wrote January 18, 1895, as follows:—

"Accept thanks for your letter of Jan. 17, relative to diphtheria.

"The notion that diphtheria may arise from a filthy condition of the premises, privy vaults, cess-pools, etc., is not a correct one. The bacilli which are the specific cause of that disease, must be present, and they do not originate spontaneously. They have been found in the throat several weeks after apparent complete recovery from the disease.

"You state that you 'Compelled the nurses to *bury* everything that passed from the patient'. No disposition of the discharges from the nose and throat, or from the bowels, of a person sick with diphtheria, should be made (unless destroyed by fire) until the same has been thoroughly disinfected. According to Lœffler, the bacilli will grow outside of the body at a temperature of 68° F. If the discharges were buried without disinfecting, that may account for the frequent cases of the disease in your locality."

Outbreaks of Diphtheria Attributed to Infection from Clothing, Old Rags, etc.

The following are representative statements of health officers (or clerks) who attributed outbreaks of diphtheria in their jurisdictions to infection from clothing, old rags, etc., with the name of the health officer and of his jurisdiction subjoined:—

"From a rag peddler's cart."—*A. L. Hutchinson, M. D., Johnstown township, Barry county.*

"Supposed to have been from old clothes."—*J. S. Newland, M. D., Walton township, Eaton county.*

"Brought by travelers in some old quilts to the house of H. L—n."—*Allen Keen, M. D., Fremont township, Isabella county.*

"Articles were sent from a family in Jackson city who had just recovered from diphtheria and in 14 days from the receipt of the articles the first case was taken sick."—*Chas. H. Haskin, M. D., Leoni township, Jackson county.*

"From books and clothing sent from Chicago, from a house, where diphtheria prevailed a year ago, said to have been disinfected."—*M. E. Bishop, M. D., South Haven village, Van Buren county.*

"From clothes that were not properly disinfected."—*Fred Johnson, H. O., Tuscola township, Tuscola county.*

HOW DEPHTHERIA IS SPREAD,—TRANSGRESSIONS OF PUBLIC-HEALTH LAWS.

Below are given extracts from correspondence relative to instances where transgressions of public-health laws resulted in the spread of diphtheria:—

Neglected outbreak of Diphtheria in Woodbridge township, Hillsdale county.

An outbreak of diphtheria occurred in the township of Woodbridge, Hillsdale county, in which there were 3 cases and one death. A. M. Ferguson, M. D., health officer of the township, wrote relative to the outbreak, Jan. 10, 1895, as follows:—

> "Dr. O. C—n reported a case of diphtheria in this township on last Friday in the family of C. H—e. On Saturday the little one died and was buried, since then other members of the family have taken the disease. Board will meet to-day to do all they can to prevent the spread of the disease."

Dr. Ferguson was requested to make a final report of this outbreak and on March 22, 1895, he wrote to the Secretary of this Board as follows, stating that the decision of the local Board of Health had been to disregard the outbreak:—

> "Your calls for final report of diphtheria have been received. Have waited till this time in order to get facts. It will be impossible to give any definite report as the board considered it useless for me to make more than one visit to the place; that was after the first patient died. There were others of the family had the disease but can not give date when taken or recovered.
>
> "The disinfecting was left to the man of the house, as he was considered a very careful man.
>
> "I think the action of the local board though not strictly in accordance with law has been best in this case.
>
> "Trusting this may give you the desired information I remain, * * *."

Neglected outbreak of Diphtheria in the city of Menominee, Menominee county.

An outbreak of diphtheria occurred in the city of Menominee, Menominee county, in which there were 58 cases and 9 deaths from that disease. The health officer, J. F. Hicks, M. D., wrote to the Secretary of this Board, Nov. 22, 1895, relative to the spread of the disease, as follows:—

> "We are having quite a number of cases of diphtheria in our city, mostly of a mild character; for that reason I find it very difficult to carry out proper quarantine regulations, as in many cases they do not call on a physician nor report the case to the health officer. But what I can I am doing to keep the disease in check. Will you send me by return mail report blanks? on receipt of which I will forward you the proper report; also please send a number of diphtheria circulars. * * *."

The following newspaper clipping recommending the use of individual drinking cups in the public schools, was enclosed in Dr. Hick's letter:—

Individual drinking cups in Schools.

"City of Menominee, Office of Health Officer,
"*Menominee, Mich., Nov. 20, 1895.*

"*To the Honorable Board of Education, of the City of Menominee, Mich.:*

"Gentlemen:—In view of the fact that we have a large number of cases of diphtheria in our city, and the number of cases seeming to be on the increase, I deem it wise to take all proper precautions to stay its further spread. I would, therefore, recommend to your honorable body, that the use of drinking water from a common cup be prohibited in our schools for the present, for the following reasons: The disease as it now exists is in many cases of a mild character, some families not even calling in a physician, nor reporting the case to the health officer, hence no quarantine, children in such instances attending school from houses in which the disease exists, and in some cases children having diphtheria in a mild form are sent to school.

"Your honorable body will readily perceive that from fifty to one hundred children drinking water from one common cup, some of whom are recovering from and some of whom have diphtheria, is a menace not only to the health, but to the lives of children who are well, and also a prolific cause of the spread of that dangerous disease.

"By complying with the above suggestion at once, you will oblige.

"Yours respectfully,
"John F. Hicks, M. D.,
"*Health Officer.*

"Acting upon the above suggestion the school board has issued orders compelling children to bring their own drinking cups and the regular cups have been put aside. This is done to prevent the spread of diphtheria in the schools."

The Secretary of the State Board of Health answered the above-quoted letter from Dr. Hicks, as follows:—

"Your letter of November 22, relative to diphtheria and scarlet fever and enclosing newspaper clipping, is before me, for which please accept thanks.

"Act 158, laws of 1895, which took effect August 30, requires householders and physicians to report all cases of dangerous communicable diseases *directly* to the health officer. (The old law provided that the notice might be given to the health officer, president or clerk of the board of health.)

"If the law is being violated, you should report all such violations which come to your knowledge to the prosecuting attorney, whose duty it is to prosecute for all violations of the law. That is, perhaps, the only way to educate the people of the necessity.

"I am very glad to know that you have succeeded in doing away with the general drinking cup at the schools, while diphtheria is present, and I think it would be a good thing to continue it, even if there is no dangerous communicable disease present in your city.

"By mail I send you several copies of the diphtheria and scarlet fever pamphlets and also blanks to enable you to report to this Office."

Neglected outbreak of Diphtheria in Grosse Pointe township, Wayne county.

Dr. John Bennett, of Detroit, wrote to the Secretary of this Board, April 18, 1895, alleging neglect, on the part of the health officier of Grosse Pointe township, Wayne county, in the restriction of diphtheria in his jurisdiction. Dr. Bennett's letter was as follows:—

"I would like to be enlightened as to the law governing the duties of a township health officer. I live close to the line between this city and Grosse Pointe township, there has been what might be called an epidemic of diphtheria in that township, for nearly 18 months past. I have had several cases there myself. In Grosse Point township proper, the word diphtheria is written with a lead pencil on a small piece of brown card board and nailed to the house; no one would ever notice it. No printed rules are furnished the family. No instructions given to remain in the house or on the premises, and when it comes to disinfecting the house or fumigating it, the family has to do that themselves,—are simply told to burn some sulphur in the house. I think the faulty way these important measures have been attended to is the direct cause of the spread of the disease and also of the great mortality.

"A brother physician informed me sometime ago that he had attended 100 cases of diphtheria during the winter of '93-'94. I asked him if he changed his clothes or wore a rubber coat; he informed me he had worn the same overcoat continuously. This is a matter I think the State Board of Health should regulate, they should require all physicians to wear rubber coats while attending any contagious disease. If the inmates of the infected house can by coming in contact with others communicate the disease, why can't the physician, who has been handling the patient? For the good of the public I hope you will give this matter some attention."

The Secretary of this Board wrote, April 19, in answer to the above quoted letter, as follows:—

"The work in Grosse Point Tp. relative to diphtheria has been very unsatisfactory to this office, and I have been trying to correct it so far as possible. There has been no return of the name and address of a health officer for the township for the present year, and I do not know who the present supervisor is. If you could inform me who is the present supervisor, perhaps a change could be made by requesting the supervisor who is president of the local board, to see that the health officer complies with the law, and if he will not comply with the law, have one appointed who will.

Neglected outbreak of Diphtheria in Paris township, Huron county.

Diphtheria has been prevalent in Paris township, Huron county, for several years. In 1893 there were 38 cases with 16 deaths reported from this disease; in 1894—47 cases with 17 deaths, and in 1895 two outbreaks of diphtheria were reported from this township. The first one, in which there were 7 cases with 3 deaths, began Jan. 14, and ended Aug 16. The second outbreak began October 14, 1895, and lasted until June, 1896. There were 130 cases with 27 deaths in the last outbreak, of these, 76 cases with 17 deaths occurred before the end of the year 1895. Relative to the source of contagium in this outbreak August Abraham, health officer of Paris township, wrote to the Secretary of this Board, Oct. 29, as follows:—

"I have good reason to believe that the disease—diphtheria—was brought into our town from Oscoda, Mich.; the family of J. K—k, from Oscoda, was here to a wedding, and one of their children was the first to be taken sick and die. Now the disease is already in seven families—5 in our town, one family in Minden township, and one in Sigel township. They were all at this wedding on the 14th of Oct. I was on the board of supervisors and did not have any knowledge of this disease, for this reason my report was delayed, but our board of health have done all in their power and knowledge to avoid the spreading of this disease. We have three good physicians employed for the sick."

A resident of Paris township, wrote to the Secretary of this Board, Nov. 2, alleging neglect on the part of the health officer, of measures for the restriction of diphtheria, as follows:—

"Our health officer of the township of Paris, does not enforce laws, rules and regulations as a health officer, as people go at large to public places, etc. There have been twelve deaths in one week."

The Secretary of this Board wrote to the health officer, Nov. 4, as follows:—

"Complaint reaches this Office that you are not enforcing the law relative to preventing the spread of diphtheria in Paris township.

"I am also informed that 12 deaths occurred in one week, from diphtheria. Is this correct?

"I trust that you will do all in your power to prevent the spread of diphtheria and that you will make weekly reports on blanks 'M' which were sent to you, so long as the disease lasts. Any aid which this Office can give you will be cheerfully rendered."

In answer to the above-quoted letter from this Office, the health officer wrote, Nov. 5, as follows:—

"Your letter of Nov. 4th is to hand. In reply would say I am sorry complaint has been made to you that I do not comply with the law relative to preventing the spread of diphtheria. I would like to know what part of law complainant means and who he is, as I do all in my power to stamp out the disease, and if complainant knows better what to do I would be only too glad to hear from him. I think report on blank 'M' reached you yesterday, where you will see all the deaths which have occurred in this outbreak of diphtheria from Oct. 15th to Nov. 2nd. Up to this date there have been no more deaths, but the disease is in one more household to my knowledge. It is in four families * * *."

The health officer gave the names of seven persons who died of diphtheria in this outbreak.

Nov. 7, the Secretary of this Board again wrote to the health officer, as follows:—

"Your letter of November 5, relative to diphtheria is before me, for which please accept cordial thanks.

"I am very glad to know that the report relative to the number of deaths was not true and that you are doing all you can to stamp out the disease and I trust that you will soon succeed.

"Relative to Joseph Krafozyk, who you said, in your letter reporting the outbreak, attended the wedding and who came from Oscoda, and as you thought, brought the disease to Paris township, I have before me a letter from the president of the village of Oscoda, in which he says that there is no such family as Joseph Krafozyk in Oscoda, and that there has not been a case of diphtheria in Oscoda in the past year"

Nov. 12, in answer to the above-quoted letter, the health officer wrote as follows:—

"Your letter of November 7, is to hand; in reply would say I was misinformed, J. K—k is not in Oscoda but in Au Sable; he keeps a tailor shop on River St. (in the Yakey block), but whether his family brought the diphtheria here is hard to prove; his child was the first taken sick and died; I am sure the disease was spread from that wedding. It is very bad here at present. I have all schools closed. I keep the sick isolated all I can from others, except physicians and nurses. There is very much complaint from the heads of the families sick with diphtheria, that I keep them too long shut up from the public. I keep them from 20 to 30 days after disinfection; is it too long?"

Nov. 12, the Secretary of this Board wrote in answer to the last above-quoted letter as follows:—

"Your letter of November 12, relative to diphtheria is before me, for which please accept thanks.

"Relative to the length of time a person having diphtheria should remain isolated, it is now proved that the duration of infection is at least three weeks, so that time should be the shortest period of isolation after apparent complete recovery."

February 18, 1896, the health officer wrote to the Secretary relative to this outbreak of diphtheria as follows:—

"Enclosed please find special final report of diphtheria. This outbreak was a bad one—103 cases, of which 20 died with diphtheria and 4 with heart failure about 10 days after the disease was over. I have had a very hard time to stamp this disease out and made many enemies and many condemn me for being too strict with quarantine and disinfection, but I do believe that if those people who attended the wedding in the house where this disease came from, had all been disinfected before they came in contact with others, it could have been stopped at once. As you have seen in my first letter I was absent from home attending the meeting of the board of supervisors and had no knowledge of this disease until about two weeks after. I find isolation is very good in some families. Where I could keep children isolated they never got diphtheria, even though they had been in the same house, if they did as I ordered, but in some places it was impossible to do so for lack of rooms, and others would not mind me.

"I know one family where the doctor in attendance and myself did all we could to have them isolated, they had plenty of rooms, but next time when I came I would see one or the other appear at the door to see the sick one; I saw the man about it but he would not believe diphtheria was so contagious; he got well educated—he lost four out of seven children—he believes it now after it is too late. I also find Antitoxic serum for diphtheria gave good satisfaction. Dr. J. S. Corcoran used it in over 20 cases and none of them died and if used in time they would not get diphtheria even if not isolated. I had four physicians in this outbreak, none of the others have used it, for what reason I do not know."

Neglected outbreak of diphtheria in Traverse City, Grand Traverse county.

An outbreak of diphtheria occurred in Traverse City, Grand Traverse county, which lasted from Jan. 11, to Nov. 6, 1895, in which there were 21 cases and 9 deaths from this disease. From the information received at this Office it is evident that measures to restrict diphtheria were neglected in this outbreak. One person having "sore throat" attended school during the day and died that same evening.

Complaint was made to this Office that the health officer was not doing his duty; a portion of the correspondence between the Secretary of this Board, the health officer of Traverse City, and others, relative to the prevalence of diphtheria is given below.

A resident of Traverse City, wrote to this Office Jan. 26, 1895, relative to the first cases in the outbreak, as follows:—

"I do not know whether our local board of health is keeping the State Board informed about the outbreak of diphtheria or not. There have been several cases in town and five have died. Among the rest, a woman 26 years of age, and a young lady by the name of D—s.

"An effort was made a week or ten days ago to have the schools closed, but the health officer, it is said opposed it. It is said that some of the cases were diagnosed as *mumps* until they were fatal. On Wednesday the daily papers assured the people that there was not much diphtheria, and on Thursday three families were placarded.

"Miss D—s, who had been going to the Central School with *a sore throat* died that night at 8 o'clock. The next morning Prof. Grawn, Supt. of Schools, closed all the schools in town, and later in the day the health officer issued a proclamation forbidding all public meetings until further notice.

"I think I am well informed in saying that while cards have been put up tardily, not a case has been quarantined up to date. The papers acknowledged 12 cases last night and five deaths."

March 17, 1895, Dr. ——, of Traverse City, wrote to this Office relative to cases of diphtheria in that city, as follows:—

"Yesterday I was called to attend a patient whom I found to have a sore throat with some membrane and the characteristic odor (of breath) of diphtheria; temperature 103.1, had had a chill, and complained of headache, weakness and general languor, with an aching, tired feeling, and I reported the case as diphtheria to the health officer; he went down and looked at the patient, pronounced it tonsillitis and did not placard the house. This morning I find membrane still intact but not increased in extent; temperature, 101.3; patient feeling some better. There have been a number of cases here of late that by the description given by those attending them are very suspicious. One child died here last week in health officer Holliday's jurisdisdiction, and under his treatment, and the day following his first visit to the place it was reported that the house was not placarded. The child had then been sick two days. A child had died in the same family (and house) about three weeks before, of diphtheria, and he had placarded the house with instructions for the householder to remove it in ten days if they were all well—so the householder told me. I consider it an imposition the way the matter has been treated in this community this winter. The health officer makes a point to avoid placarding for anything he does not find to be malignant. I have not had any literature on the subject for some time; but if I am not mistaken the law is that when we find the throat sore and membrane with suspicious appearance we shall report it as diphtheria. The health officer says it hurts the business of the town.

"During the late outbreak a number of children went home from school and came down immediately with the disease, and yet the schools were not closed until the superintendent took upon himself to close them. Many people had already taken their children out of school and one young lady went home sick with it and died in 48 hours (I believe).

"Has the health officer authority (is it his duty) to decide when a case is reported by another physician? If the health officer's position is well taken, I shall never report a case to him until it proves beyond a doubt to be a very malignant case. Please send me some literature for reference and guidance in the matter and some to distribute among my cases."

The Secretary of this Board wrote March 19, in reply to the above-quoted letter from Dr. —— as follows:—

"By this mail I send you ten pamphlets on the restriction and prevention of diphtheria as per your request. I also enclose herewith a marked pamphlet and a copy of resolutions adopted by this board relative to all cases of sore throat.

"I have written to the health officer, requesting him to report to this office relative to diphtheria.

"I note what you say in your letter about a child having died in Health Officer Holliday's jurisdiction. Will you kindly inform me the name of the city, village or township, as the case may be, of which Holliday is health officer, in order that I may be enabled to write to him."

A "blue letter" was sent from this office, March 17, 1895, to Dr. A. H. Holliday, health officer of Traverse township, Grand Traverse county, asking for a report of the cases of diphtheria which were alleged to have occurred in his jurisdiction; in response Dr. Holliday wrote to the Secretary of this Board, March 23, as follows:—

"Enclosed please find my first report of health for township of Traverse, county of Grand Traverse. I was not in possession of blanks when our first case of diphtheria was reported, about five weeks ago. There was an outbreak of diphtheria in Traverse City in December, 1894, January and February, 1895, and our two cases, both of which died, were undoubtedly contracted from the village. You see there is considerable of our town which is not within the village limits. The two cases reported by me are the only ones I have definite knowledge of though I was informed that there were others before my appointment to office.

"I shall be glad to co-operate with you in using every means to prevent the spread of this or any other dangerous disease."

Complaints having been made to this Office again, by citizens of Traverse City, that proper restrictive measures were not being taken with cases of diphtheria then present in Traverse City, the Secretary of this Board wrote to the prosecuting attorney, Hon. W. H. Foster, Oct. 4, 1895, as follows:—

"DEAR SIR:—Complaints reach this Office that the health officer of Traverse City does not comply with the law, that deaths have resulted in Traverse City in consequence. These complaints come from sources which apparently have no connection with each other. Similar complaints were made some years ago when the same person was health officer who now occupies that position. How much of these complaints is charged solely to the health officer, and how much should be charged against practicing physicians, it is difficult to determine, but the evidence is strong that the health officer does not take, or order taken, precautions for the restriction of diphtheria except in severe cases. Inasmuch as the disease is frequently spread by mild cases, diphtheria cannot be restricted except by careful attention to mild as well as to severe cases.

"The State Board of Health urges upon local health officers the duty of enforcing restriction in every case of a disease reported by a reputable physician as diphtheria, believing that the public safety should in every instance have the benefit of any doubt. It is alleged that the health officer of Traverse City does *not* take such action, that cases reported to him as diphtheria are not restricted, he claiming that they are not diphtheria. For instance it is alleged that July 31 Dr. Galerno reported to the health officer of Traverse City that George Sanders had diphtheria, and that no action was taken by the health officer. It is alleged that soon after that, Drs. Moon and Elms treated a boy on the south side of the village that died of diphtheria, and no restrictive measures were taken. The boy's name was Parker. This case may not have been reported to the health officer; but if such cases are not reported to the health officer, it is his duty to notify the Prosecuting Attorney. In so small a place such cases must come to the knowledge of the health officer, just as they come to the knowledge of this Office. It is alleged that Doctor Garner had a case on the south side of the village which he said was diphtheria, and that no card was put on the house until the day before the child died. It is alleged that in all cases of sore throat unless it is so severe as to threaten life it is not called diphtheria by the health officer.

"So many complaints reach this Office that it would probably not be difficult for you to find evidence of specific instances. Perhaps those I have mentioned in this letter may be sufficient. Whether the fault rests with the practitioners mainly, or with the health officer, I trust that you will find some way to take action which will put a stop to the sickness and deaths which have so long *been permitted* to occur in and about Traverse City from this preventable disease.

"Any aid which this Office can give you, will be cheerfully rendered."

The health officer of Traverse City, wrote to the Secretary of this Board, October 28, 1895, as follows:—

"Our Prosecuting Attorney has just shown me a letter from you in regard to diphtheria here. The case Dr. ——— reported, I visited and found to be a simple case of tonsillitis. No appearance of diphtheria. I have this to say about Dr. ———, he is not a physician of any standing. Not one of the regular physicians here recognize him in any way. I shall always make a personal examination of the cases he reports. The case in the Parker family treated by Drs. Elms and Moon was not in my jurisdiction. It is in the township but not in the village. I had nothing to do with it officially or professionally. The case of Dr. Garner—the Dr. reported the case as soon as he saw it, but said he thought it was not diphtheria. He isolated the case thoroughly, and as soon as he became convinced it was diphtheria he notified me, and the house was placarded.

"Now I think you owe me an apology for any such implication as you conveyed to our Prosecuting Attorney, and should certainly correct your statement to him."

In reply to the above-quoted letter from the health officer of Traverse City, the Secretary of this Board wrote Nov. 1, as follows:—

"Accept my thanks for your letter of Oct. 28, relative to diphtheria in Traverse City and vicinity and my letter to the prosecuting attorney of your county.

"You ask for an apology 'for any such implication as you conveyed to our prosecuting attorney.' On the contrary, I find, on looking over the subject again, that I did not make the case so strong against you as I ought to have done. Our books and your correspondence here seem to prove that you are not dealing with the subject of diphtheria as it should be dealt with, and that the charges that have been sent in here so numerously from your city must be true. It is charged that you do not accept the diagnosis of physicians; your letter of Oct. 28 says the same thing. It is charged that you do not pay any attention to cases of diphtheria, unless they are severe; our books and your reports to this Office seem to demonstrate that this must be true; for instance, Feb. 9, you made a final report of diphtheria in Traverse City of 12 cases of which 5 died, a mortality of nearly fifty per cent. There must have been other cases, which were not reported by you. Again, Sept. 30, your final report included two cases and both died,—a mortality of one hundred per cent.

"The law contemplates that this Office should get its *first* knowledge from the local health officer. Our records show that usually you do not report diphtheria until after it has been reported to you from this Office; and even then you do not make the reports in accordance with the law, which requires that they shall be 'on blanks and in accordance with instructions received from said State Board.'

"I think you must have been laboring under several misapprehensions or you would not have permitted the lapses to which I have referred. I trust that you will understand that I have very great regard for you personally, and the reason why I am making this subject as plain to you as possible is in the hope that the public service may gain by such plain statements of the facts as they appear here. If I can aid you in any way it will give me pleasure.

"One prominent failure in your work is not complying with the recommendations of this board—to take precautions in all cases of sore throat, when diphtheria is present. Where bacteriological tests have been made, as for instance in Rochester, N. Y., it has been found that many cases believed not to be diphtheria, but simply 'tonsillitis,' have proved on bacteriological tests to be diphtheria. Unless you prove, in every instance, by a competent bacteriologist, that the sore throats reported to you as diphtheria are not diphtheria, you should accept the diagnosis of any physician who reports a given case as diphtheria. I think your action on this point has been fundamentally wrong.

"Under the law, this Office expects not only to receive the first notice of diphtheria from the local health officer, but also expects the local health officer to keep 'the Secretary of the State Board of Health constantly informed respecting every outbreak of a disease dangerous to the public health, and of the facts so far as the same shall come to his knowledge, respecting sources of danger of any such diseased person or infected article being brought into or taken out of the township, city or village of which he is the health officer.'

"This office supplies blanks for all reports for which it asks. Samples are enclosed herewith, and others will be sent to you when needed.

"Your letter of Oct. 28 was the first information this office had that the case in the Parker family treated by Doctors Elms and Moon was not in your jurisdiction, but in the township. I have written to the township official on that subject."

C. T. Grawn, Supt. of Schools of Traverse City, wrote to the Secretary of this Board several times during the year 1895 asking for literature on the subject of the restriction of the dangerous communicable diseases. In answer to a letter from Mr. Grawn, of Dec. 10, the Secretary of this Board wrote as follows:—

"In accordance with your request of Dec. 10, I have sent you by American Express, charges prepaid, forty copies of leaflets Nos. 226 and 227 and forty copies each of several other leaflet publications relating to the subject of teaching in the schools the modes of spreading and the best methods for the restriction and prevention of the dangerous diseases. I hope you and your teachers will continue in the good work you are doing in this connection.

"I am glad to hear that you are making such a systematic study of the subject. It is especially important that the children and citizens of Traverse City understand the facts in connection with the restriction and prevention of *diphtheria*, as that seems to be the disease which afflicts your children, causing the loss of many precious lives. I have always attributed the failure to restrict this disease partly to the fact that the disease was not recognized early enough (probably having been diagnosed sore throat, croup, membranous croup, etc.) and the proper precaution taken. It is especially important that the disease be recognized and pronounced diphtheria, so placarded, strict isolation enforced, and thorough disinfection enforced after complete recovery of the patient. The germs remain in the throat after recovery, so isolation must be prolonged after recovery.

"If you can conveniently, I hope you will lay special stress on the points above mentioned in connection with diphtheria.

"Any information you may at any time have regarding the presence of diphtheria in your city, will be given my immediate attention."

Diphtheria supposed to have been contracted from European Immigrants.

An outbreak of diphtheria occurred in the township of Delta, Eaton county, which lasted from March 9, to March 30, 1895, and in which there were four cases and three deaths, the source of infection in this malignant outbreak is said to have been from European Immigrants. Mrs. J. W. Dann called at this office and reported substantially as follows relative to the Edwards family who came from Woodstock, Ontario, via the Grand Trunk R. R.: They had first-class tickets but were put into a second-class coach with European Immigrants just before reaching the St. Clair Tunnel. John Edwards, aged 17, was the first case; three other cases followed in the same household, and three of the four cases died. In his final report of the outbreak the Supervisor says all cases were isolated as soon as the nature of the disease was discovered. The house was disinfected by burning sulphur; clothing, bedding, etc., were disinfected; burials were private, and the results seem to have been good in preventing the spread of the disease to other households.

Outbreak of Diphtheria in Port Austin township, Huron county.

An outbreak of diphtheria occurred in Port Austin township, Huron county, which lasted from November 20 to December 15, 1895, and in which there occurred 4 cases with 3 deaths. The points of interest in this outbreak are that the infection seems to have been carried in bedding and clothing from an infected house in Detroit, and that by careful isolation of the first family in which the disease appeared it did not spread beyond the one houshold, although the disease was of a malignant type; 75 per cent of the patients died.

E. B. Gibson, M. D., health officer of Port Austin township, wrote to the Secretary of this Board, Oct. 25, relative to the above-mentioned outbreak, as follows:—

> "The accompanying report of diphtheria is alarming in its possibilities. I understand the wife of one Frank D—s of Detroit, a daughter of this family, died in Detroit of diphtheria and some of the family went from here to the funeral. One of the girls took the clothes of the dead woman and brought them home some three weeks ago. I cannot learn how long the family have been sick, but the father says the oldest girl is getting better. I have been out of town all day but I hasten to report the case to you at once. As I learn particulars I will notify you. I have aroused the whole neighborhood to the danger of going near them, and I think they understand the danger, as we had several deaths from the same cause three years ago.
>
> "If possible I am going to stamp it out with this family as I have a watchman that I think is trustworthy.
>
> "It might be well to examine into the D—s case in Detroit as it might have been taken to other parts of the State through the same means. I will keep a good watch on the neighborhood and will advise you from time to time."

The Secretary of this Board wrote to Dr. Gibson, Oct. 28, as follows:—

> "Please accept cordial thanks for your letter of Oct. 25, and the outbreak report of same date.
>
> "Instructions have already been sent you, as information of the outbreak reached this office a day or two ago.
>
> "I have placed the subject before the health officer of Detroit to investigate. I understand the diphtheria was in the family of M. G—i. If this is not the case please inform me. * * *."

November 18, Dr. Gibson wrote relative to the same outbreak of diphtheria, as follows:—

> "I enclose you final report of diphtheria outbreak in the family of M. G—i. We congratulate ourselves on such a happy conclusion of what we fully expected would result in an epidemic, from the fact that we believed hundreds had been exposed and we did not know where it might break out next. The Polish people seem to be thoroughly frightened and I believe will seek advice on the first appearance of sore throat. I think I have waited a safe length of time after the case was reported recovered to satisfy myself that all danger is past. Dr. Harrington gave me every assistance in his power to help suppress the threatened danger. He is deserving of thanks. Thanking you for your kind assistance and advice, * * *."

Diphtheria in Bronson village and Kinderhook township, Branch county.

John E. Outwater, M. D., health officer of Bronson village, Branch county, wrote to the Secretary of this Board, Nov. 13, 1895, relative to cases of diphtheria which occurred in his jurisdiction and the township of Kinderhook. Dr. Outwater questioned the efficiency of sulphur fumigation and other disinfectants to destroy diphtheria contagium. Dr. Outwater's letter to the Secretary of this Board was as follows:—

> "I wish to ask you, do you consider thorough fumigation a protection against diphtheria? I treated a case, a child of three years, in the family of my brother-in-law; it was malignant. As soon as the child was buried we commenced to fumigate, the supervisor of the township aiding. We burned a considerable more sulphur than the law requires, and fumigated from cellar to garret; until the smoke poured out between the shingles for hours. All carpets, bedding, clothing, etc., was hung on lines and thoroughly exposed to the sulphur fumes; floors washed and scalded also wood work and windows; all

cotton clothing, etc., boiled in strong chloride of zinc solution; clothing used around the child was burned; all excretions were disinfected and burned; drains were torn up, disinfected and filled up, and water carried in troughs on top of the ground to some distance from the house; well of drinking water pulled up and driven deeper. Cellar cleaned out thoroughly, chloride of lime used in large amounts; also Labarraque's solution, Bromo chloralum and Merchand's peroxide of hydrogen. In fact everything was done that is advised or could be thought of to protect the other members of the family.

"The child had not been exposed to any person, clothing or building where diphtheria had been. In five weeks and two days from the time the child was buried the other daughter aged fifteen years came down with the disease in a milder form. She was visiting at my house as were my son, a boy of 21 years, and my daughter, a girl of 24 years. My niece stayed only a few moments after she first felt the soreness in her throat and at that time she had no fever, and had no exudation in the throat until two days after. In three days after the evening the children spent together at my house my daughter came down with the disease in the most malignant form and in six days my son with the same. Both died. Two of my sisters had a mild form of the disease during the sickness of my son and daughter, whom they had been nursing. I forgot to state that when my niece and children met, my niece and daughter kissed each other, but my niece and son merely shook hands; they spent about three hours in each others' society.

"I have a nursing babe, age 9 months, my niece held her that evening and kissed her several times, and the babe was in the room with her a few moments in the morning, but my son did not see her after the first evening. The babe has escaped thus far (nearly six weeks) also my hired girl aged 22 years, and a cousin of my niece, a girl aged 14 years, who slept with my niece that night and was in the same house for two days after. My nephew aged 14 years was in the same house with my daughter for nearly 3 days after she was taken sick; he has escaped thus far—nearly five weeks.

"Now what I would like to know is what good fumigation did in the first case? The second case had been too long to have taken it from the first case direct, and had not been exposed from any other source any more than the first case had; and secondly, did my children contract the disease from my niece? and if so why did others who were younger and exposed at the same time and later, also escape? The others reside near my niece while my children lived with their grandparents 16 miles from here.

"I forgot also to state there is a creek within 12 rods of my brother-in-law's house which has been more or less dry for several months, with dead fish and clams in the bed of it, but not in great quantities.

"I have written at great length but you will see by my letter that my experience of the last few weeks has been very bitter and although we fumigated the house when my children were sick four times thoroughly, and papered and calcimined the walls and burned all bedding used by them besides using every other precaution, I still do not feel safe to allow my nephew to return home, neither does my brother-in-law feel safe to have his daughter return to her home. She was sick at the home of her grandparents in this village and is still there. Hoping I have not tired your patience too far I shall be very glad of any advice you can give me on the subject. I have read everything you have sent me from your office, also all works I have bearing on the subject of contagium and fumigation besides counseling with several of the leading physicians of Adrian, Quincy and Coldwater. But still I have a feeling of uneasiness concerning the amount of good derived from fumigation on account of the terrible results of the first case mentioned."

The Secretary of the State Board of Health wrote to Dr. Outwater, November 16, 1895, in answer to the above-quoted letter, as follows:—

"Your letter of November 13 relative to diphtheria is before me for which please accept cordial thanks.

"Permit me in the first place to extend to you my deepest sympathy in your great affliction.

"Relative to the disinfection it was probably efficient as far as it reached, but there was probably some infected place or thing that was not reached by the fumes of burning sulphur, nor otherwise thoroughly disinfected.

"The bacillus which is the specific cause of diphtheria, has been found in the throat *weeks—even months* after apparent complete recovery from the disease; and it has also been found in the throats of persons exposed to the disease who were not sick with diphtheria. And, again, it has been known to remain in the throat for weeks before the person became noticeably sick with the disease. This is probably the way the disease was carried into your family; the germ was probably either in the throat of your niece or perhaps in your own throat, as I understand you were the attending physician for the cases at Kinderhook. There are a great many ways by which the disease may be spread, and at times it is very difficult to trace the source of contagium.

"The enclosed marked diagram I think is good evidence that isolation and disinfection restrict diphtheria, and because in one instance it would seem that it was not efficient, that certainly does not prove it to be so as a rule.

"Again thanking you for your letter and extending to you my heartfelt sympathy in your affliction."

Question of the Vitality of Diphtheria Contagium.

E. J. Ross, M. D., health officer of Rome township, Lenawee county, wrote to the Secretary of this Board, November 5, 1895, relative to the source of contagium in an outbreak of diphtheria in his jurisdiction, as follows:—

"I send this morning an account of outbreak of diphtheria, which needs some explanation. Yesterday morning I sent a weekly report with no diphtheria noted for last week. I was called last Sunday, Oct. 27, to see Lois Root who seemed to be suffering from an attack of tonsillitis. Saw her again, Oct. 28; left with the understanding that if she did not get along well I was to be notified. Did not see her again till Nov. 3, in evening. Thought it was diphtheria; she died suddenly on the morning of Nov. 5. I have quarantined the house; private burial, and used disinfectants freely. Have learned that on the same street west a very severe form of tonsillitis has been prevailing for four or five weeks previously. I fear they were diphtheria."

Dr. Ross wrote to the Secretary of this Board again Dec. 23, as follows:—

"Fifteen years ago last November, Mr. Root living in the same house where he now lives lost three daughters within four weeks from diphtheria. The house was not disinfected. I was health officer at that time but did not hear about it till long after they were dead and buried. They had two doctors. One said it was diphtheria, the other said it was not. As the parents did not wish to be quarantined they the more readily believed the latter, and no notice was sent to my office. When the second and third daughter died their mother cut a lock of hair from the head of each and put it away in a box as a keepsake. About 12 to 14 days before the first case herewith reported was taken, she got out the box and examined the hair. Mr. Root and wife were not at home when this occurred, and when he learned about it he buried the hair. He has now no doubt that the deaths of his three daughters were caused by diphtheria. Query—Could this have been the present source of contagium?

"As a personal favor will you kindly give me your opinion of the bearing of the above facts upon the present outbreak, if any?"

December 27, the Secretary of this Board wrote to Dr. Ross in reply to the above-quoted letter, as follows:—

"The vitality of the bacillus, which is the specific cause of diphtheria, is very remarkable, and it is probable that the source of contagium was from the source you mention, and yet it is quite possible that it was from some other source. The subject is a very important one, and I trust that you will thoroughly investigate it, in order to ascertain, if possible, whether the contagium was from any other source.

"It is very difficult at times to trace the source of contagium in diphtheria, as there are so many ways by which the disease can be spread. The bacillus has been found in the throat weeks after apparent complete recovery; again it has been found in the throats of persons exposed to the disease who were not noticeably sick with diphtheria, and it is believed that these persons can communicate it to others, although not noticeably sick with diphtheria themselves. And, again, it has been known to remain in the throat for weeks before the person became noticeably sick with the disease. It is possible that the source of contagium was from one of these last-mentioned causes.

"Your letter is very interesting to me, and, as I said before, I trust that you will thoroughly investigate the subject, and let me know the result of your investigations."

No answer was received to the above-quoted letter until Aug. 10, 1896, when Dr. Ross wrote to the Secretary of this Board as follows:—

"I have delayed answering your kind letter of last November hoping to learn something more definite. Further investigation has failed to throw more light upon the subject. I refer to the locks of hair cut from the heads of two girls who died of diphtheria fifteen years previously."

OUTBREAKS OF DIPHTHERIA IN WHICH ISOLATION AND DISINFECTION WERE ENFORCED.

The following is the substance of a few health officers' statements which are representative of the statements of those health officers whose reports indicated that they had quite carefully enforced isolation and disinfection:—

Diphtheria in Watervliet township, Berrien county.

J. W. Gunn, M. D., health officer of Watervliet township, Berrien county, in his final report of an outbreak of diphtheria, in which there occurred 6 cases with 2 deaths, stated substantially as follows relative to the outbreak and the efforts made for the restriction of the disease:—

Source of contagium unknown. At the beginning of the outbreak the disease was present in one household, and at the close of the outbreak in four households. All of the patients were kept isolated from all persons except nurse and physician. All rooms, garrets and cellars in the houses were disinfected by burning 3 pounds of sulphur to each 1,000 cubic feet of air space. Sulphur was burned in the privy. Clothing, bedding, etc., were hung on chairs and fumigated; discharges of the patients were disinfected with carbolic acid, and then buried. Burials were conducted under the supervison of the health officer. Houses were placarded. "The evidence of success attending the efforts at restriction was the cessation of the outbreak."

Diphtheria in Tekonsha village, Calhoun county.

Relative to an outbreak of diphtheria in the village of Tekonsha, Calhoun county, in which there were 2 cases and both died, the health officer, John L. Ramsdell, M. D., in his final report stated substantially as follows concerning the supposed source of the contagium and the efforts to restrict the spread of the disease:—

The first case I thought was produced by impure water. I found on inspecting the premises that the well was acting as a drain for all of the slops of the kitchen. The disease occurred in two households. Both patients were isolated from all other people except nurse and physician. All rooms, garrets and cellars were fumigated, using 3 pounds of sulphur to the 1,000 cubic feet of air space. Chloride of lime and iron sulphate were used in the privy vault. Sulphur was burned in the privy. Clothing, bedding, etc., were disinfected by using hot zinc solution and sulphur fumes. Discharges of the patients were disinfected by solution of iron sulphate and chloride of lime, and then buried. "Bodies were wrapped in a sheet wrung out of a strong solution of corrosive sublimate, and buried immediately." The patient was placed in a room in the upper part of the house and no one but the nurse allowed to enter the room. The second case contracted the disease from the first, but by careful isolation and disinfection the outbreak was restricted to these two cases.

ESTIMATED NUMBER OF OUTBREAKS AND CASES OF DIPHTHERIA PREVENTED AND LIVES SAVED BY ISOLATION AND DISINFECTION.

Tables 9 and 10 and the following diagram compare the average numbers of cases and deaths in outbreaks of diphtheria where the measures of isolation and disinfection, prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases and deaths in those outbreaks where these measures were neglected.* By Table 10 it may be seen that during the nine years, 1887–95, there were over six times as many cases and nearly six times as many deaths per outbreak in those outbreaks in which these measures were neglected as in those outbreaks in which they were enforced.

By Table 9 it may be seen that during the year 1895 there were reported to the Office of the State Board of Health 388† outbreaks of diphtheria, with 2,292 cases and 425 deaths. Had no efforts at restriction been made, and had the average numbers of cases and deaths per outbreak remained the same as in the column headed "Isolation and Disinfection both Neglected," there would have occurred 5,261 cases and 1,024 deaths, and taking from these respectively the cases (2,292) and deaths (425) which did occur, leaves 2,969 cases and 599 deaths indicated as prevented in these 388 outbreaks, by isolation and disinfection. By the same method of computation for each year the indicated saving during the nine years, 1887–95, is 28,718 cases and 5,964 lives.

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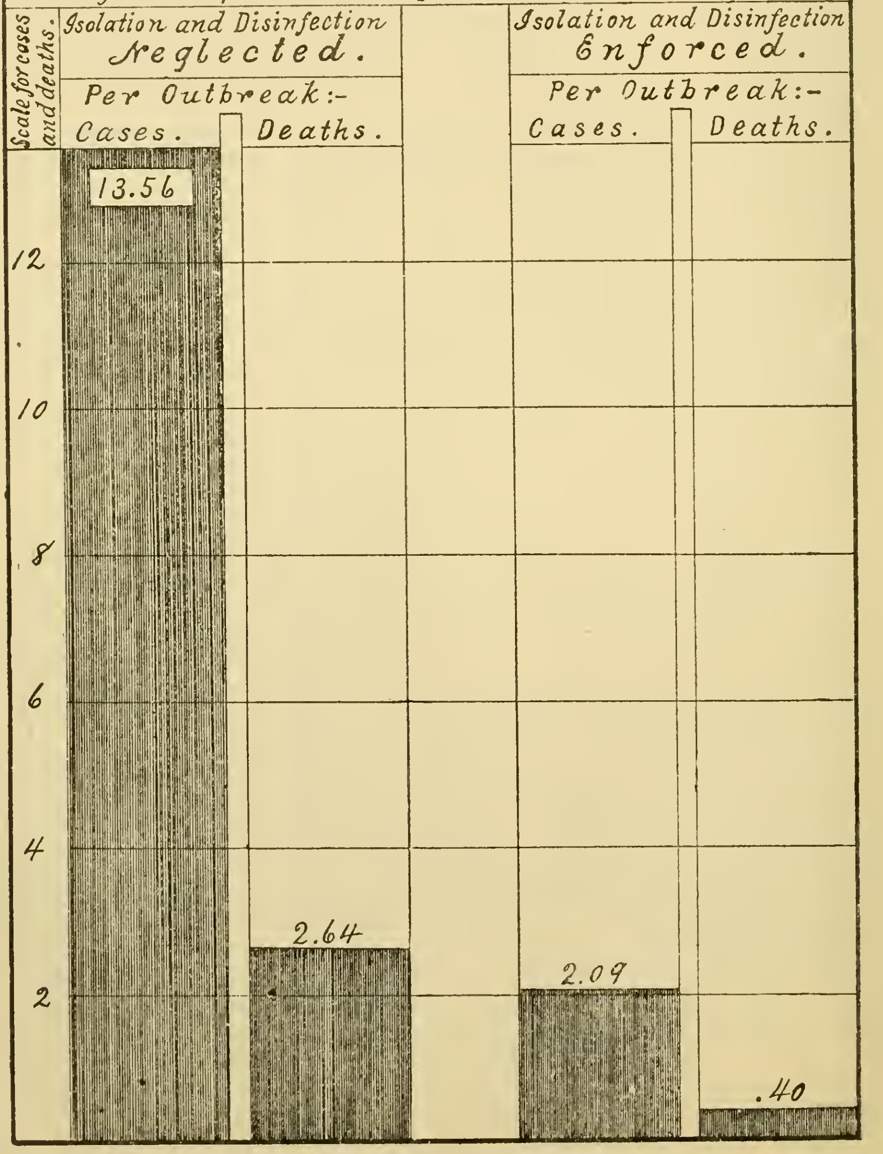
* In the compilation of the reports for Tables 9 and 10 and the diagram showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed "Isolation and Disinfection both Neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed "Isolation and Disinfection Enforced." If, however, he neglects to properly isolate or disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this Office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed "Isolation or disinfection or both not mentioned, or statements doubtful."

† Whenever a break of 60 days or more has occurred in the progress of a communicable disease in a given township, village or city it has hitherto been regarded as two different outbreaks, but in estimating outbreaks for these tables, 9 and 10, and the corresponding tables for other diseases, if the second appearance of the disease originated from the first the intermission was disregarded and it was treated as a single outbreak. Also, comparisons of *years* require that outbreaks be counted as closed at the end of the *year;* while in comparing *outbreaks* for testing the value of isolation and disinfection it is necessary to take *complete outbreaks*, even where they extend from one year into the next. This explains the apparent discrepancy between the number of outbreaks here given and the number given at the beginning of this article.

Isolation and Disinfection Restricted Diphtheria in 1895.

Diagram 2.--Diphtheria in Michigan in 1895:-Exhibiting the Average numbers of cases and deaths per outbreak:-in all outbreaks in which Isolation and Disinfection were both Neglected; and in all outbreaks in which both were enforced. (Compiled in the office of the Secretary of the State Board of Health, from reports made by local health officers.)



[PLATE 874]

TABLE 9.—*Diphtheria in Michigan in 1895: Exhibiting the Average Numbers of Cases and Deaths per Outbreak:—(1) in all the 388 outbreaks reported; (2) in the 178 outbreaks in which it is doubtful whether or not Disinfection or Isolation was enforced; (3) in the 9 outbreaks in which Disinfection was enforced and Isolation doubtful; (4) in the 34 outbreaks in which Isolation was enforced and Disinfection was doubtful; (5) in the 25 outbreaks in which Disinfection was enforced and Isolation neglected; (6) in the 27 outbreaks in which Isolation was enforced and Disinfection neglected; (7) in the 45 outbreaks in which Isolation and Disinfection were both neglected; (8) in the 70 outbreaks in which Isolation and Disinfection were both enforced.*

	(1)		(2)		(3)		(4)		(5)		(6)		(7)		(8)	
	All outbreaks.		Isolation or Disinfection or both not mentioned, or statements doubtful.		Disinfection enforced—Isolation doubtful.		Isolation enforced—Disinfection doubtful.		Disinfection enforced—Isolation neglected.		Isolation enforced—Disinfection neglected.		Isolation and Disinfection both neglected.		Isolation and Disinfection both enforced.	
	(388 outbreaks.*)		(178 outbreaks.)		(9 outbreaks.)		(34 outbreaks.)		(25 outbreaks.)		(27 outbreaks.)		(45 outbreaks.)		(70 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals....	2,292	425	1,102	209	69	8	93	19	210	37	62	5	610	119	146	28
Averages.	5.91	1.10	6.19	1.17	7.67	.89	2.74	.56	8.40	1.48	2.29	.19	13.56	2.64	2.09	.40

*These do not include the cases and deaths in Detroit, Grand Rapids, East Saginaw, Kalamazoo and Cheboygan, because of the difficulty in determining the beginning and ending of an outbreak in those cities, in which the disease is present in some part of the city nearly all the time. See foot-note on page 181.

TABLE 10.—*Exhibiting for the nine years, and for each of the nine years 1887–95, the numbers of Reported Outbreaks, Cases and Deaths; also for this nine-year Period, the average number of Cases and Deaths per Outbreak in all outbreaks; in those Outbreaks in which Isolation or Disinfection was Doubtful; in which both Isolation and Disinfection were Neglected; in which both Isolation and Disinfection were Enforced; and also the Numbers of Cases and Deaths Indicated to have been prevented by Isolation and Disinfection.*

Years.	All Outbreaks.*			Isolation and Disinfection, or both, not Mentioned, or Statements Doubtful.			Isolation and Disinfection both Neglected.			Isolation and Disinfection both Enforced.			Indicated Saving of Cases and Lives by Isolation and Disinfection.	
	Out-breaks.	Cases.	Deaths.	Out-breaks.	Cases.	Deaths.	Out-breaks.	Cases.	Deaths.	Out-breaks.	Cases.	Deaths.	Cases.	Deaths.
1887	398	2,321	561	202	732	190	60	822	195	78	198	51	† 3,132	† 733
1888	311	1,529	324	199	810	189	34	527	81	58	101	31	3,292	416
1889	376	1,986	418	254	1,314	280	41	478	108	63	98	14	2,398	570
1890	439	2,713	619	291	1,649	401	71	902	169	46	70	15	2,862	426
1891	532	2,965	643	366	1,777	389	79	944	194	70	157	33	3,392	666
1892	525	3,485	740	323	2,341	456	52	657	147	49	105	24	3,146	746
1893	536	3,133	746	303	1,681	362	74	1,020	282	65	159	45	4,253	1,296
1894	420	2,262	404	202	986	174	56	738	122	81	176	37	3,274	512
1895	388	2,292	425	178	1,102	209	45	610	119	70	146	28	2,969	599
Totals for the 9 years, 1887–95	3,925	22,686	4,880	2,318	12,392	2,650	512	6,698	1,417	580	1,210	278	‡28,718 ‡28,653	‡ 5,964 ‡ 5,992
Average for the 9 years, 1887–95	436	2,521	542	258	1,377	294	57	744	157	64	134	31	3,191	663
Average cases and deaths per outbreak for the 9 years, 1887–95	....	5.78	1.24	....	5.35	1.14	....	13.08	2.77	....	2.09	.48	....	....

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* These do not include the cases and deaths in a number of the larger cities (see foot-note to Table 9), because of the difficulty in determining the beginning and ending of an outbreak in those cities, in which the disease was present in some part of the city nearly all the year. See foot-note on page 181. † The numbers of cases and deaths in this double column are found by multiplying "All Outbreaks" for each year by the average number of cases or deaths per outbreak in those outbreaks in which "Isolation and Disinfection both were neglected," for that year, and deducting from the result thus obtained, the cases or deaths, as the case may be, which were *reported* to have occurred that year. ‡ The two sets of numbers appearing in this column are based on two distinct methods of solution which are explained as follows:—(1) the 28,718 cases and 5,964 deaths are totals of the columns representing cases and deaths saved as explained in the † foot-note, (2) the 28,653 cases and 5,992 deaths are obtained by multiplying the average numbers of cases and deaths per outbreak for the nine years, 1887–95 (13.08 and 2.09, where isolation and disinfection were neglected), by the total number of outbreaks to find the numbers which would have occurred if all outbreaks had been neglected, and subtracting therefrom the numbers of cases and deaths that were reported as having occurred during the nine-year period.

TABLE 11.—*Exhibiting the reported Period of Incubation, stated in days, in 123 cases of Diphtheria. Compiled from reports of Health Officers in Michigan, for the year, 1895.*

Incubation period—Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	19	20	21	28	30
Cases in each period	1	*5	†6	‡22	§10	¶5	15	**9	††8	‡‡10	2	4	3	§§12	1	¶¶1	3	2	4

* In 3 of these cases it was reported as *about* 2 days.
† In 1 of these cases it was reported as *about* 3 days.
‡ In 8 of these cases it was reported as *about* 4 days.
§ In 4 of these cases it was reported as *about* 5 days.
¶ In 2 of these cases it was reported as *about* 6 days.
In 8 of these cases it was reported as *about* 7 days.
** In 4 of these cases it was reported as *about* 8 days.
†† In 3 of these cases it was reported as *about* 9 days.
‡‡ In 3 of these cases it was reported as *about* 10 days.
§§ In 6 of these cases it was reported as *about* 14 days.
¶¶ In 1 of these cases it was reported as *about* 20 days
In 1 of these cases it was reported as *about* 21 days.

The average period of incubation of diphtheria in the 123 cases is 9 days.

TABLE 12.—*Exhibiting, relative to Diphtheria in Fifty nine Instances in Michigan in 1895, the Reported Period of Incubation, within certain Limits, stated in Days; also the Means, the Average of which may Represent the Average Period of Incubation.*

In twelve Instances.		In twelve Instances.		In twelve Instances.		In twelve Instances.		In eleven Instances.	
Days.	Means.	Days.	Means.	Days.	Means.	Days.	Means.	Days.	Means.
1 to 2	1.5	3 to 4	3.5	3 to 7	5	3 to 15	9	5 to 20	12.5
2 to 3	2.5	3 to 4	3.5	3 to 7	5	4 to 5	4.5	6 to 10	8
2 to 3	2.5	3 to 4	3.5	3 to 7	5	4 to 5	4.5	6 to 16	11
2 to 5	3.5	3 to 5	4	3 to 7	5	4 to 5	4.5	7 to 8	7.5
2 to 11	6.5	3 to 5	4	3 to 10	6.5	4 to 6	5	7 to 9	8
2 to 12	7	3 to 5	4	3 to 15	9	4 to 6	5	8 to 10	9
2 to 14	8	3 to 7	5	3 to 15	9	4 to 7	5.5	8 to 12	10
2 to 20	11	3 to 7	5	3 to 15	9	4 to 8	6	8 to 24	16
3 to 4	3.5	3 to 7	5	3 to 15	9	4 to 9	6.5	9 to 10	9.5
3 to 4	3.5	3 to 7	5	3 to 15	9	4 to 14	9	9 to 12	10.5
3 to 4	3.5	3 to 7	5	3 to 15	9	5 to 8	6.5	9 to 14	11.5
3 to 4	3.5	3 to 7	5	3 to 15	9	5 to 8	6.5	----------	----------

The average of all the means, for the 59 instances, is 6.5 days.

AGES OF GREATEST PREVALENCE OF, AND MORTALITY FROM, DIPHTHERIA.

In Table 13 are shown the numbers of cases and deaths from diphtheria in Michigan in 1895, in which the ages were stated in the health officers' reports. In this table the cases and deaths are arranged in *age-groups*, showing what per cent the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths; the per cent the deaths in each group were of the cases in that group, and the per cent the deaths in special groups were of all deaths.

Table 14 gives the precentages that the cases and deaths which occurred in certain age-groups were of all cases and deaths where the ages were given in the health officers' reports. The percentages for the year 1895 are taken from Table 13; percentages for 1892, '93 and '94 from similar tables in the Annual Reports for previous years.

Methods Employed in Compiling, Relative to Ages.

In compiling data relating to ages, used in tables in this article, when the ages are stated, as they usually are, in full years, the cases, or deaths, are compiled under the years mentioned. When the ages are stated in months, or years and months, the following method is pursued:—

Persons under one year and six months old are classed as aged *one* year. Those over one year and six months and under two years and six months are classed as aged *two* years. Those over two years and six months and under three years and six months are classed as three years of age, and so on for each year.

In dividing the ages into five-year periods, the first period consists of all ages from birth to five years and six months. The second five-year period includes all ages over five years and six months and under ten years and six months. The third five-year period includes all ages over ten years and six months and under fifteen years and six months; and in each succeeding period the same arrangement is followed.

TABLE 13.—*Exhibiting in certain Age-Groups, the numbers of Cases and Deaths from Diphtheria, the per cent that the cases in each group were of All Cases of Known ages; the per cent that the Deaths in each group were of All Deaths at Known ages; and the per cent that the Deaths in each group were of the Cases in that group.—Compiled from all reports for the year 1895 which stated the ages.*

	Number and per cent of Cases and Deaths in certain Age-groups.*																
Ages in groups of years	All Known Ages.	0-1.	2.	3.	4.	5.	0-5.	5-10.	10-15.	15-20.	20-25.	25-30.	30-35.	35-40.	40-45.	45-50.	50 and over.
No. of cases	†2,460	94	118	182	167	185	746	786	420	170	115	76	67	28	19	18	15
Per cent the cases in each group were of all cases of Known ages	100	3.8	4.8	7.4	6.8	7.5	30.3	32.0	17.1	6.9	4.7	3.1	2.7	1.1	.8	.7	.6
No. of deaths	†521	43	48	65	56	52	264	149	69	15	9	5	2	3	2	1	2
Per cent the deaths in each group were of all cases in that group	21.2	45.7	40.7	35.7	33.5	28.1	35.4	19.0	16.4	8.9	7.8	6.6	3.0	10.7	10.5	5.6	13.3
Per cent the deaths in each group were of deaths, Known ages	100	8.2	9.2	12.5	10.8	10.0	50.7	28.6	13.2	2.9	1.7	1.0	.4	.6	.4	.2	.4
Per cent the deaths in special groups were of all deaths, Known ages	--------	50.7					79.3		17.8			3.0					

* Method of grouping is stated in the text preceding this table.

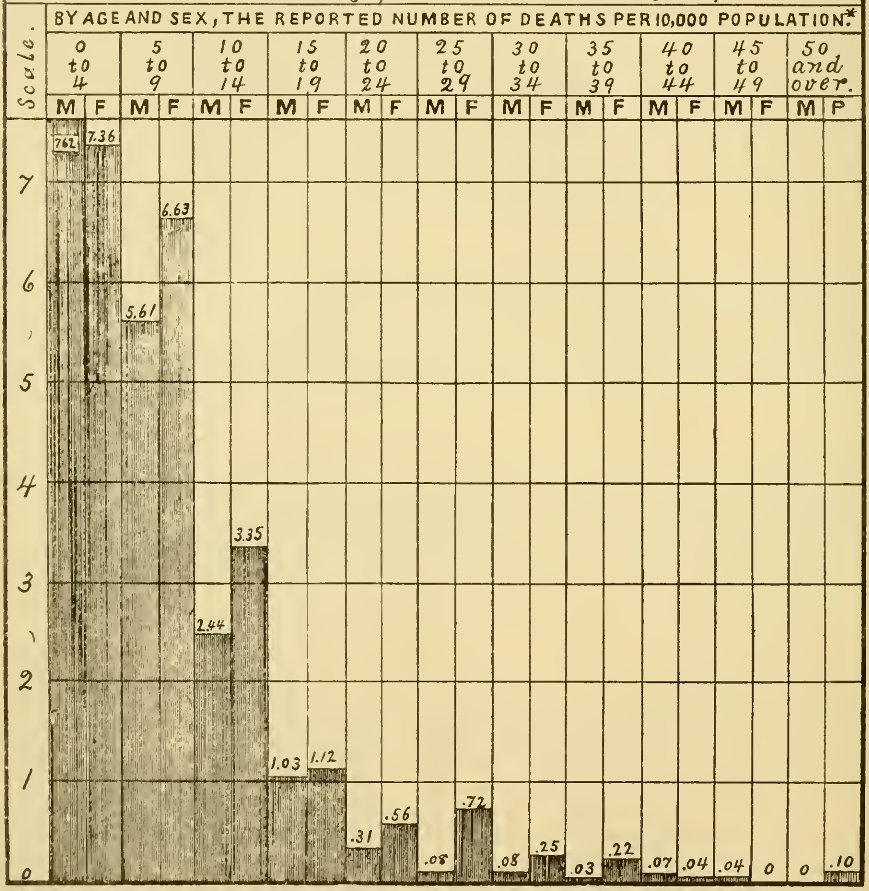
† Does not include those cases or deaths where the age was not stated.

TABLE 14.—*Exhibiting in certain Age-Groups, the numbers of Cases and Deaths from Diphtheria in each of the years 1892–95; the per cent that the Cases in each group were of All Cases; the per cent that the Deaths in each group were of all Deaths.—Compiled from all reports for the years 1892–95 which stated the ages.*

Year.		Total No. included.	Per Cent of Cases and Deaths in certain Age-groups.*											
			All Ages.	0 to 5.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 Years and over.
1892.	Cases	2,065	100	22.0	32.7	21.0	9.5	5.3	3.5	2.3	1.8	0.8	0.6	0.5
	Deaths	476	100	34.9	36.6	18.1	4.8	2.3	1.5	0.8	0.6	0.2	0	0.2
1893.	Cases	1,864	100	25.1	31.3	22.1	10.1	6.1	4.1	2.7	1.7	0.9	0.7	0.6
	Deaths	435	100	38.2	35.6	13.3	7.4	2.8	1.6	0.7	0	0.2	0	0.2
1894.	Cases	2,178	100	23.1	31.3	19.4	10.3	4.7	3.9	2.8	2.1	1.2	0.7	0.6
	Deaths	412	100	35.7	36.9	15.8	6.1	1.7	1.7	0.7	1.0	0	0	0.5
1895.	Cases	2,460	100	30.3	32.0	17.1	6.9	4.7	3.1	2.7	1.1	0.8	0.7	0.6
	Deaths	521	100	50.7	28.6	13.2	2.9	1.7	1.0	0.4	0.6	0.4	0.2	0.4
1892–95.	Cases	8,567	100	25.3	31.8	18.5	9.1	5.1	3.6	2.6	1.7	.9	.7	.6
	Deaths	1,844	100	40.3	34.2	15.1	5.2	2.1	1.4	.7	.5	.2	.1	.3

* The method of grouping is stated in the text, preceding Table 13.

Diagram 3.— Exhibiting, by Age and Sex, the Average Annual number of reported deaths from diphtheria per 10,000 persons* living in Michigan during the four years, 1892-95. Compiled from all reports to the Secretary of the State Board of Health, for the years mentioned, which stated the age and sex of persons who died of diphtheria.



*Of corresponding sex and age.

[PLATE 866]

This Diagram (3) graphically represents Table 15 which supplies the figures in detail.

TABLE 15.—*Exhibiting by Sex, in Age-groups, for the four years 1892–95, the population, the Number of persons who died from Diphtheria, and the Average Annual Number of deaths per 10,000 of population of corresponding Sex and Age.* (*Compiled from such reports to the State Board of Health as stated the Sex and Age.*)

Age in periods of years.	Sex.	Population, four years, 1892–5, being four times the annual average.	Number of deaths during the four years, 1892–5.	Annual average death-rate per 10,000 population of corresponding sex and age.
0 to 4	Males	532,892	*406	*7.62
	Females	510,586	376	7.36
5 to 9	Males	500,491	281	5.61
	Females	490,528	325	6.63
10 to 14	Males	463,622	113	2.44
	Females	451,068	151	3.35
15 to 19	Males	438,882	45	1.03
	Females	437,910	49	1.12
20 to 24	Males	419,451	13	.31
	Females	412,400	23	.56
25 to 29	Males	385,435	3	.08
	Females	359,466	26	.72
30 to 34	Males	357,535	3	.08
	Females	318,026	8	.25
35 to 39	Males	323,481	1	.03
	Females	278,928	6	.22
40 to 44	Males	268,865	2	.07
	Females	229,652	1	.04
45 to 49	Males	230,316	1	.04
	Females	198,678	0	00
50 and over	Males	686,839	0	00
	Females	597,654	6	.10

*The deaths from diphtheria during the four years 1892–95, were compiled so that the first group included all deaths in persons of less than five years and six months of age. In estimating the population, the first age-group includes all persons under five years of age. This makes the number of deaths in the first group slightly larger than it would be if grouped the same as the population; as a consequence the average annual death-rate for this first group is very slightly higher than it should be. (The method of grouping in age-periods is stated in the text, preceding Table 13.)

It is interesting to note in studying Diagram 3 and Table 15 that in the first age-period the death-rate is higher for males than for females; that in all the succeeding age-periods up to 40 years the death-rate among females was greater than among males; there were more deaths from diphtheria among females than among males at these ages and the female population was less than the male population in all those age-periods.

TABLE 16.—*Exhibiting, by Sex for each year of Age, and in certain Age-groups, the number of persons who died from Diphtheria during the year 1895, and the per cent the deaths in each Age-group were of deaths at all ages. (Compiled from such reports to the State Board of Health, as stated the sex and age.)*

Sex.	Ages in Years, and groups of Years.	Number and per cent of Deaths by Sex, in certain Age-periods.*																							
		All ages known.	1-5.					5-10.					10-15.					15-20.					20-25.	25-30.	30 and Over.
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20			
Males.	No. of Deaths, by single Years.	....	23	24	33	30	32	27	8	12	12	7	5	9	7	3	8	1	3	1	1	0			
	No. of Deaths, by Groups of Years	250	142					66					32					6					1	0	3
	Per cent the Deaths in each age-group were of the total deaths among Males	100	57					26					13					2					1	0	1
	Average age at Death, from Diphtheria	6.4																							
Females.	No. of Deaths, by single years.	....	20	24	32	26	20	22	22	15	15	9	11	10	7	7	2	1	3	4	..	1			
	No. of Deaths, by Groups of Years	271	122					83					37					9					8	5	7
	Per cent the Deaths in each age-group were of the total deaths among Females	100	45					31					14					3					3	2	3
	Average age at Death, from Diphtheria	8.3																							
Both Sexes.	No. of Deaths, by single years	....	43	48	65	56	52	49	30	27	27	16	16	19	14	10	10	2	6	5	1	2			
	No. of Deaths, by Groups of Years	521	264					149					69					15					9	5	10
	Per ct. the deaths in each age-group were of the total deaths from diphtheria in both sexes	100	50.7					28.6					13.2					2.9					1.7	1.0	2.0
	Average age at Death, from Diphtheria	7.4																							

* The method of grouping is stated in the text, preceding Table 13.

TABLE 17.—*Exhibiting, by Sex, the per cent of persons in certain Age-groups* who recovered from Diphtheria, in Michigan, during the year 1895; also the average age and the number of cases included. (Compiled from such reports as stated the ages.)*

Year.	Sex.	Average age of non-fatal cases. Years.	No. of cases included.	Age.—In Periods of Years. Per cent of (non-fatal) Cases in each Period of age.													
				All Ages.	Five years and under.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 to 60	60 years and over.
1894.	Males.....	11.9	788	100	22	34	20	10	5	3	2	2	1	.25	.25	0	0
	Females..	14.8	978	100	19	27	21	12	6	5	4	3	2	1.3	0.4	0.2	0.3
1895.	Males.....	10.6	855	100	29.4	35.8	17.3	6.3	4.2	2.2	2.5	0.4	0.8	0.7	0.5	0	0
	Females..	13.5	1,084	100	21.3	30.5	18.7	9.3	6.5	4.8	4.1	2.0	0.9	1.0	0.5	0.3	0.1

* The method of grouping is stated in the text, preceding Table 13.

TABLE 18.—*Exhibiting, by Sex and in certain Age-groups, the per cent of persons who died from Diphtheria in Michigan, during the four years and each of the four years, 1892–95; also the average age at death, and the number of deaths included. (Compiled from such reports as stated the ages.)*

Deaths from Diphtheria.											
Year.	Sex.	Average age. Years.	No. of Deaths included.	Ages,—In Periods of Years. Per Cent of Deaths in each Period of Age.*							
				All ages.	0 to 5.	5 to 10.	10 to 15.	15 to 20	20 to 25.	25 to 30.	30 Years and over.
1892.	Males	7.1	231	100	46	32	16	4	1	1	....
	Females	8.7	240	100	41	31	15	5	2	3	2
1893.	Males..............	8.1	207	100	43	34	9	10	3	1	1
	Females...........	8.8	228	100	34	37	17	5	2	3	1
1894.	Males..............	7.8	180	100	39	39	14	6	1	0	1
	Females...........	9.8	232	100	33	35	17	7	2	3	2
1895.	Males..............	6.4	250	100	57	26	13	2	1	0	1
	Females...........	8.3	271	100	45	31	14	3	3	2	3
1892–95.	Males..............	7.4	868	100	47	32	13	5	2	.4	.8
	Females...........	8.9	971	100	39	33	16	5	2	3	2

* The method of grouping is stated in the text, preceding Table 13.

Table 18 gives a summary of the data contained in Table 16, and of similar tables made for previous years. The combined material for the four years (1892–95) also is given in Table 18. The average age at death from diphtheria in those years was, for males, 7. 4; for females, 8. 9 years.

There were 103 more deaths of females than of males during the four years.

AVERAGE DURATION OF DIPHTHERIA.—FATAL AND NON-FATAL CASES.

Fatal Cases.

TABLE 19.—*Exhibiting, by sex of patient, the duration (in days) of fatal cases of sickness from Diphtheria, in Michigan, during the three years 1893–5. Arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of Diphtheria.											
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per cent of Deaths in each Period of Days.								
			All cases.	1 to 5 days.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 and over.
1893.	Males	192	100	35	43	13	5	2	1	0	0
	Females	203	100	38	36	15	6	3	1	.5	0
1894.	Males	131	100	39	37	13	5	1	0	2	3
	Females	167	100	29	36	20	7	2	2	2	.6
1895.	Males	135	100	39	38	13	6	2	0	0	2
	Females	153	100	44	32	12	7	3	1	0	1

From Table 19, it may be seen that of the 135 males and 153 females who were reported to have died from diphtheria in 1895, and of which the interval between the day of being taken sick and the day of death was given, the largest per cent died in the first five days of sickness; and the next highest per cent died in the period from the fifth to the tenth days of sickness.

Seventy-seven per cent of the males and 76 per cent of females died during the first ten days of sickness.

The average duration of the fatal cases, in 1895, was 8.4 days for males and 7. 9 days for females.

Non-Fatal Cases.

TABLE 20.—*Exhibiting by Sex of patient, the Duration (in days) of Non-Fatal cases of sickness from Diphtheria, in Michigan, during the three years, 1893–95. Arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Non-Fatal Cases of Diphtheria.												
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per Cent of Cases in each Period of Days.									
			All Periods.	1 to 5.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 days and over.
1893.	Males	442	100	9	35	25	14	9	4	2	2
	Females	517	100	8	37	27	12	8	4	2	2
1894.	Males	503	100	8	31	23	20	9	6	1	2
	Females	606	100	9	30	20	20	12	4	2	3
1895.	Males	394	100	8	32	29	16	8	4	2	2
	Females	531	100	10	32	32	14	6	3	2	4

In Table 20 it may be seen that in non-fatal cases of dipthheria for the year 1895, the duration of sickness in five-day periods was nearly the same in both sexes; that 69 per cent of the males and 72 per cent of the females recovered before the fifteenth day of sickness.

The average duration was about 14 days, alike for males and females.

BACTERIOLOGICAL EXAMINATIONS AND THE USE OF ANTI TOXIN IN CASES OF DIPHTHERIA, AS CARRIED OUT BY THE HEALTH DEPARTMENT OF THE CITY OF KALAMAZOO.

In the year 1895 the health officer of the city of Kalamazoo succeeded in having bacteriological tests made in suspected cases of diphtheria, and anti-toxin administered, at the city's expense, to such cases as required it, and were unable to pay for the same.

This scientific diagnosis and treatment of a malignant disease, by the health authorities of Kalamazoo, is worthy of commendation, and the same methods of diagnosis should be employed in other cities of Michigan.

Adolph Hochstein, M. D., health officer of Kalamazoo, wrote to the Secretary of this Board, Oct. 7, 1895, relative to bacteriological examination in the diagnosis of diphtheria, as follows:

> "In our present epidemic of diphtheria, which is clinically of a milder type than I have ever seen before, bacteriological examination by a competent bacteriologist, who is paid by the city *pro rata*, is made in every doubtful case, especially so in the beginning, when a strict diagnosis is hard to be made. In the larger proportion of cases antitoxin treatment has been used with good results. To people who are unable to stand the expense, the city furnishes the antitoxin and the operator free of charge. I can flatter myself, that through my efforts the city council has been induced to introduce these innovations."

October 8, the Secretary of this Board wrote in answer to the above-quoted letter from Dr. Hochstein, as follows:—

"Your letter of October 7, relative to diphtheria is before me, for which please accept thanks.

"I am very glad to know that you are having bacteriological examinations made in every doubtful case.

"Please accept congratulations relative to your success in inducing the council to introduce antitoxin where the people are unable to stand the expense, and especially in having the bacteriological examinations made in the beginning as a guide to action to restrict the disease."

December 5, A. W. Crane, M. D., bacteriologist for the city Board of Health of Kalamazoo, wrote to the Secretary of this Board, as follows:—

"Sept. 3d, the Health Officer of the city of Kalamazoo recommended the appointment of a city bacteriologist to make the cultural and microscopic tests in cases of suspected diphtheria. I was appointed and was allowed $2.50 by the city for each case so examined. Later the city council decided also that diphtheria patients unable to bear the cost should receive the 'antitoxin' at the city's expense. And the city health officer detailed me to make the injections. For each case so treated I receive $1.50 above the cost of the antitoxin.

"At the last meeting of the city council, Monday, Dec. 2, 1895, Alderman Fletcher, *M. D.*, in recent session proposed to abolish the office of city bacteriologist, on the ground that it is a needless expense, and that the patients examined or the attending physician, *not* the city, should pay for the bacteriological diagnosis. The bill which provoked this resolution was for $40.50, $30.00 being for bacteriologic examinations, the remaining $10 50 being for antitoxin injections and water analysis. This is a city rated at 23,000 inhabitants.

"When the resolution was made in open council, the city Health Officer, Dr. Hochstein, arose, expostulated, and so ably defended the usefulness of the bacteriologic diagnosis in suspected diphtheria cases that the resolution was laid on the table for one week.

"While it is probable that the matter will rest there indefinitely it would be a great help and a greater satisfaction to have from the chief executive Health Officer of the State a letter emphasizing the fact that the early diagnosis of suspected diphtheria by the culture tube and microscope, and the treatment of indigent cases by 'antitoxin' are measures of public protection—limiting the spread of a communicable disease dangerous to the public health, and saving human life.

* * * * * * * * *

"Hoping that you will find this matter worthy of your consideration and desiring an early reply (one before the council meets next Monday, Dec. 8), I am, * * * ."

December 6, the Secretary of this Board answered the above-quoted letter from Dr. Crane, as follows:—

"It is needless to say that I was surprised to hear that any attempt had been made to do away with such a valuable work as I have been informed was being done in your city in connection with the bacteriological diagnosis of diphtheria. A letter from Doctor Hochstein had informed me that such a department had been established in connection with the health department and that very valuable work had been done. I was so much gratified with the news that at the meeting of the Board, October 11, I presented the subject, and it seemed to be the view of the members that your city had taken a step in advance for the most improved sanitary work for the restriction and prevention of the dangerous disease—diphtheria. It was gratifying to me to learn that one city in Michigan had inaugurated and was prosecuting the scientific diagnosis of that dangerous disease which causes near to the greatest number of deaths in Michigan.

"Without a bacteriological test or examination, it is impossible in many cases of sore throat to tell whether or not the disease is diphtheria and to determine whether or not the public health and life should be guarded against its spread. The time is not far distant when every city board of health will have connected with it a bacteriological department for the accurate and speedy diagnosis of diphtheria. The greatest difficulty this Board experiences in the restriction of diphtheria, is the fact that the first case is not recognized in time for complete isolation. If the first case of diphtheria could be promptly isolated in every outbreak, I believe that as in outbreaks of small-pox, the disease would be uniformly restricted to the first case. However, I send you a copy of a diagram showing the experience in Michigan during the five years ending with 1890. You will see that in 317 outbreaks of diphtheria where the first case was probably not recognized and in which isolation and disinfection *were not enforced* the average cases per outbreak were 13.57 and the average deaths were 2.67; but in 252 outbreaks in which isolation and disinfection were enforced there was a great reduction in the cases and deaths, the average cases per outbreak being 2.04 and the average deaths being (0.48) less than one-half of a death per outbreak. Michigan experience shows that where the first case is promptly recognized and strict isolation and disinfection are enforced that about four-fifths of the cases and four-fifths of the deaths from diphtheria are avoided; meaning an enormous life-saving every year in Michigan from this disease.

"I sincerely hope that your city will take no step 'backward' by abolishing the bacteriological department of the board of health.

"I have written Mayor Ihling on this subject."

On the same day, Dec. 6, that the above-quoted letter was sent to Dr. Crane, a similar one was sent to Hon. Otto Ihling, Mayor of the city of Kalamazoo. Again on December 14, the Secretary of this Board wrote to Mayor Ihling, as follows:

"Pardon me for again addressing you on the subject of the proposed abolition of the bacteriological bureau connected with your efficient local board of health, but the subject is of such interest to me as well as to the citizens of Kalamazoo that I cannot refrain from again expressing my hope that the work will not be done away with, or in any way crippled.

"It is certainly true that the expense for bacteriological tests should be paid by those who are to receive the greatest benefit therefrom. Permit me to suggest that notwithstanding the fact that it is too late to prevent the entry of the disease in a household attacked, yet such tests are sometimes of great value to the individual sick, or near friends, because the information may yet be useful for saving some member of the household, or for preventing the sending of the disease to some relative or friend. And sometimes the treatment for the cure may be changed by such knowledge, as for instance, to the use of antitoxine. But the information is even more valuable to the community. If a child or adult person is taken sick with diphtheria in Kalamazoo it is of vital interest to every father and mother in Kalamazoo that they and the health authorities know the fact; that all possible safeguards may be employed for the protection of their children. In many cases of sore throat it is impossible for physicians to determine whether or not the disease is diphtheria; and the bacteriological test is the only sure way to tell whether or not a certain case of sore throat is diphtheria which should be promptly restricted in accordance with the law. By bacteriological tests, in the hands of a practical expert, diphtheria can be promptly stamped out, where if such suspicious case was not recognized and strict isolation was not enforced the life of every child in your city might be endangered. The risks to the public are much more numerous than to the household already invaded, and the subject is of greater interest to the public than it is to the sick family, in which frequently all liable to the disease have already been exposed to it.

"I believe that any money the city of Kalamazoo may spend for expert bacteriological examinations in cases of suspected diphtheria, will be money well spent, and will be the means of saving many precious lives in your city.

Doctor Hochstein wrote to the Secretary of the State Board of Health, December 17, as follows:—

"Your never ceasing efforts in promoting sanitation in Michigan, wherever and whenever possible and your laudable interest in our bacteriological warfare, as shown by your two letters to Mayor Ihling, have materially aided us in holding our position. The enemy has made no new attack and I guess everything will remain in *statu quo antea* and we will go on protecting the good people of this city against diphtheria with better weapons than we could do ever before. I think, you will enjoy seeing the missiles which have been used by the contestants in this fight, and I therefore take the liberty of sending you the papers containing the same."

BACTERIOLOGICAL EXAMINATIONS FOR PURPOSE OF DIAGNOSIS IN DOUBTFUL CASES OF DIPHTHERIA, AS EMPLOYED BY THE DETROIT BOARD OF HEALTH.

Late in the year 1895 the board of health of the city of Detroit began the use of culture tests in suspected cases of diphtheria. Jan. 2, 1896, the Secretary of this Board wrote to the health officer of Detroit enquiring as to the method of bacteriological examinations employed by the Detroit Board; his letter was as follows:—

"Will you have the kindness to write me so that I may have before the next meeting of this Board which occurs within a few days, a knowledge of just what is done in Detroit for the restriction of diphtheria? In your report for November, on page 9, I see statements relative to bacteriological examinations. Will you have the kindness to give me the details of how this service is managed? I notice 'diphtheria culture sets prepared 240.' Are these sets obtained by the physicians directly from your office? If not, how are they supplied?

"I should be glad to be able to state just what is done in Detroit on the report of a case of diphtheria by a physician. Is the case immediately ordered to be isolated? In case, on bacteriological examination, the Klebs-Loeffler bacillus is not found, what is then done about the case? In case a suspicions case of diphtheria occurs, just what is the method?

Dr. Duffield wrote, Jan. 4, 1896, in answer to the above-quoted letter from this office, as follows:—

"Your request at hand. Physicians are compelled to report cases to us based on clinical symptoms—In case they have doubt about any case and clinical symptoms are not marked enough to make a satisfactory diagnosis, they send to the nearest station and procure a culture set which is forwarded to us and incubated for twelve hours, the growth upon the culture medium examined, by the miscroscope and the Klebs-Loeffler bacillus determined as present or not. And in case it is present and the clinical symptoms reported by physician sustain the microscopic diagnosis it is quarantined.

"We have the chemist and microscopist constantly at work on these cases. We have not gone as far as New York board of health, and will not quarantine until both the microscope and clinical symptoms agree.

"You have probably seen the discussion on this subject in the Detroit Medical Library Association, and this was the result of that thorough discussion. Able papers were read on both sides—by writing to the Secretary you will probab'y be able to get an article. We order isolation pending result of culture, etc.

"When a disagreement comes between physicians, one being called in after the house is placarded and claiming it is not diphtheria, the disagreement is settled by culture from throat of patient. Until that is had the placard and quarantine remain. I enclose printed detail."

The enclosed "printed detail" mentioned in Dr. Duffield's letter is given below:—

"BOARD OF HEALTH, DETROIT, MICH.

"DIRECTIONS FOR MAKING CULTURES IN SUSPECTED CASES OF DIPHTHERIA.

"The patient should be placed in a good light, and, if a child, properly held.

"Depress the tongue and rub the cotton swab gently, but freely, against any visible exudate.

"In cases where the exudate is confined to the larynx, avoiding the tongue, pass the swab far back, and rub it freely against the mucous membrane of the pharynx and tonsils. Without laying the swab down, withdraw the cotton plug from the culture tube, insert the swab and rub that portion of it which has touched the exudate over the surface of the blood serum. *Do not push the swab into the blood serum, or break the surface in any way.* Then replace the swab in its own tube, plug both tubes, place them in a box, and return the culture set immediately to the station from which it was received, or to the Health Department. The blank forms of report which accompany each outfit should be completely filled out and forwarded to the station with the tubes. The diagnosis will be ready by noon the following day, providing the tubes reach the station before 3 P. M., or the Health Department by 4:30 P. M. The attending physician can obtain this immediately by telephoning to the Department after 12 o'clock, noon, or when this is not done he will be notified by mail. Cases proving to be diphtheria by bacteriological examination will be reported to the Bureau of Contagious Diseases and subjected to the usual rules and regulations covering contagious diseases."

"OFFICE OF THE BOARD OF HEALTH, DETROIT, MICH.

"INSTRUCTIONS TO PHARMACISTS.

"*As to the Distribution of Culture Sets to Physicians.*

"Keep culture sets in a cool, dry place.

"*Never remove cotton plugs from tubes* as this renders them unfit for use.

"The wooden box containing two glass tubes, one of which encloses a sterilized wire and cotton. the other containing a mixture of blood serum, comprises the so-called 'culture set.'

"Culture sets are to be given to physicians only, or to their representatives. Give but one culture set for each case of suspected diphtheria to be examined. Physicians are not to obtain culture sets to 'keep on hand' in their offices. They must get only that number which they require for *immediate* service.

"Take the names and addresses of the physicians obtaining culture sets and inform the health office promptly by telephone, when the same is returned by the doctor.

"A portion of the directions on the culture boxes reads as follows:—

"The blank forms of report which accompany each outfit should be completely filled out and forwarded to the station with the tubes. The diagnosis will be ready by noon the following day, providing the tubes reach the station before 3 P. M, or the Health Department by 4:30 P. M.

"The blanks above referred to are in the tops of the culture boxes.

"W. I. TIBBALS, PH. C.
Bacteriologist.

SAMUEL P. DUFFIELD, M. D.
Health Officer."

Jan. 6, the Secretary of this Board wrote to Dr. Duffield again as follows:—

"Please accept cordial thanks for your letter of Jan. 4, giving me information relative to the way you deal with diphtheria in Detroit. The letter was just received, it having been missent to Owosso.

"The two following sentences of your letter are not plain, and I am not able to distinguish just what is meant. 'We have not gone as far as New York board of health, and will not quarantine until both the microscope and clinical symptoms agree.' 'We order isolation pending result of culture, etc.' I would be pleased to have you explain more fully what you mean. If practicable I shall be glad to have your reply before the next meeting of this Board, Jan. 10.

"I note what you say about the discussion before the Detroit Medical Library Assoc. and will endeavor to get the article to which you refer. Can you inform me of the name of the secretary of that association?"

Dr. Duffield wrote, Jan. 7, in answer to the above-quoted letter as follows:—

"By reference to New York Board of Health Scientific Bulletin No. 1, on page 6 and further you will find full explanations. We have not gone as far as New York board of health who placarded the houses on the result of finding the Klebs-Loeffler bacillus, without taking into consideration there were clinical symptoms which should justify or corroborate the microscope, such as exudate in the throat, on the tonsils, fever, malaise, etc., 'We order isolation pending culture'; we mean that preceding culture the case must be isolated and treated as diphtheria until we can determine that it is not or that it is diphtheria."

SCARLET FEVER IN MICHIGAN.—YEAR ENDING DECEMBER 31, 1895.

During the year ending December 31, 1895, there were reported to the Secretary of the State Board of Health 574 outbreaks of scarlet fever in 462 localities in Michigan, which resulted in 3,908 cases and 125 deaths. Notwithstanding the marked improvement which has occurred both in promptness and accuracy of reports of local health officials to the central office, it is probable that not all cases of and deaths from scarlet fever are yet reported. For the year 1895 there were reported to the Secretary of State 116 deaths from scarlet fever, 9 less than were reported to this office; and the Secretary of the State Board of Health estimates that the deaths reported to the Secretary of State should be increased by about 40 per cent to equal the actual number of deaths which occur. According to this estimate, there were about 162 deaths from scarlet fever during 1895, in Michigan, instead of 125, as reported to the State Board of Health.

Some of the purposes of this compilation are stated on a preceding page of this Annual Report, in the article on "Communicable Diseases in Michigan in 1895."

Scarlet Fever in 1895, Compared with Previous Years.

From year to year there has been a steady improvement, both in the methods adopted by the State Board of Health in securing and compiling reports, and in the efforts made by local health authorities throughout the State to furnish in their reports the information desired by the State Board. These facts, together with the constantly increasing population, make it difficult to determine the exact increase or decrease of prevalence of the disease in the State by comparison of the numbers of outbreaks of the disease, and the cases and deaths resulting therefrom; and these facts should be borne in mind in referring to Table 1. While these facts might reasonably be expected to produce a constant increase in the reported prevalence of the disease, Table 1 shows that such increase has not occurred in the last three years, the reported cases and deaths, the cases and deaths per outbreak, and the fatality from this disease, during those years, having decreased, and in the last year (1895) markedly so.

Table 2, exhibiting the number of deaths from scarlet fever, per 100,000 persons living, reported to the Secretary of State, represents the annual fluctuations of the total death-rate from scarlet fever in Michigan during the 28 years, 1868–95. A diagram graphically representing this fluctuation for the 24 years, 1868–91, is printed on page 234 of the Annual Report of this Board for 1895. By Table 2, it may be seen that since the registration of deaths was begun the death-rate from scarlet fever has never been so small as during the year 1895.

Distribution of Scarlet Fever by Divisions and Counties during 1895.

The following tables, 3 and 4, exhibit in different ways the distribution of scarlet fever in Michigan in 1895. The map which follows Table 4, shows for each county of the State the sickness and death-rates per 10,000 inhabitants, the number of localities where the disease was present during the year, and the number of outbreaks which occurred in those localities. The map enables the reader to see the locations of the several counties.

TABLE 1.—Scarlet Fever in Michigan.—*Numbers of Reported Outbreaks, Localities (in which they occurred), Cases and Deaths; Average Numbers of Cases and Deaths Per Outbreak, and the Per Cent of Cases which proved fatal, as reported for each of the 14 years, 1882–1895; with the departure of the same for 1895 from 1894, and from the Average of the same for the 11 years, 1884–94.*

Year.	Reported Outbreaks	Reported Localities.	Reported Cases.	Av. No. of Cases per Outbreak.	Reported Deaths.	Av. No. of Deaths per Outbreak.	Deaths per 100 Cases.
1882	....	83	849	....	138	....	*16.0
1883†	164	150	1,802	11.	248	1.51	*14.0
1884‡	324	296	2,476	8.	230	.71	9.0
1885	356	337	2,750	8.	187	.53	7.0
1886	386	302	3,046	8.28	275	.71	9.0
1887	353	297	3,400	9.63	314	.89	9.0
1888	381	315	2,989	7.85	200	.52	6.7
1889	421	382	3,535	8.40	166	.39	4.6
1890	481	417	3,835	7.97	162	.34	4.2
1891	605	516	6,212	10.27	286	.47	4.6
1892	625	548	7,075	11.32	487	.78	6.9
1893	675	566	6,065	8.99	415	.61	6.8
1894	678	547	5,500	8.11	203	.30	3.7
1895	574	462	3,908	6.81	125	.22	3.2
Average for eleven years, 1884-1894	480	411	4,262	8.80	266	.57	6.5
Departure of 1895 from 1894	—104	— 85	—1,592	—1.30	— 78	—.08	—.5
Departure of 1895 from the average for 11 years, 1884-94	+ 94	+ 51	— 354	—1.99	—141	—.35	—3.3

* Probably in some instances only the fatal cases were reported.
† Use of the blank form "M" for weekly reports was begun in May, 1883.
‡ Use of the annual reports of health officers in compiling scarlet fever for the communicable disease article was begun in 1884.

TABLE 2.—*Exhibiting the death-rate from Scarlet Fever reported in Michigan per 100,000 population for each of the 28 years, 1868–95. (The data for this table were supplied by C. L. Wilbur, M. D., Chief of Vital Statistics of Michigan, Department of the Secretary of State.)*

Year.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.
Death rate	8.48	22.09	71.96	56.62	44.33	43.94	32.23	29.99	27.41	26.91	27.74	26.26	22.66	22.82
Year.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.
Death rate	34.25	37.94	17.91	13.13	16.69	16.25	16.13	11.72	10.60	18.70	20.23	16.30	7.27	5.09

TABLE 3.—*Exhibiting the Estimated Population* of Michigan for the year 1895, by tiers of counties (Upper Peninsula as one tier); also the number of cases of and deaths from Scarlet Fever* REPORTED *from each of these divisions for 1895, and the number of cases and deaths per 10,000 population of each division.*

Counties in Groups, most Northern ones First.			Estimated Population 1895.*	Reported Cases of Scarlet Fever, 1895.	Reported Cases per 10,000 of Population.	Reported Deaths from Scarlet Fever, 1895.	Reported Deaths per 10,000 of Population.
State			2,278,579	3,908	17.15	125	.55
Upper Peninsula	Alger. Delta. Schoolcraft. Luce. Houghton. Ontonagon. Gogebic. Baraga.	Mackinac. Chippewa. Keweenaw. Marquette. Iron. Menominee. Dickinson.	213,073	562	26.38	34	1.60
Eleventh tier of counties	Emmet. Charlevoix.	Cheboygan. Presque Isle.	43,372	13	3.00	0	0
Tenth tier of counties	Leelanaw. Antrim. Otsego. Montmorency.	Alpena.	48,721	78	16.01	1	.21
Ninth tier of counties	Benzie. G'd Traverse. Kalkaska.	Crawford. Oscoda. Alcona.	42,933	1	.23	0	0
Eighth tier of counties	Manistee. Wexford. Missaukee. Roscommon.	Ogemaw. Iosco.	67,590	13	1.92	0	0
Seventh tier of counties	Mason. Lake. Osceola. Clare.	Gladwin. Bay. Huron. Arenac.	157,735	76	4.82	2	.13
Sixth tier of counties	Oceana. Newaygo. Mecosta. Isabella.	Midland.	92,559	151	16.31	13	1.40
Fifth tier of counties	Muskegon. Montcalm. Gratiot. Saginaw.	Tuscola. Sanilac.	250,905	288	11.48	11	.44
Fourth tier of counties	Ottawa. Kent. Ionia. Clinton.	Shiawassee. Genesee. Lapeer. St. Clair.	384,315	1,173	30.52	25	.65
Third tier of counties	Allegan. Barry. Eaton. Ingham.	Livingston. Oakland. Macomb.	231,765	308	13.29	4	.17
Second tier of counties	Van Buren. Kalamazoo. Calhoun. Jackson.	Washtenaw. Wayne.	514,449	773	15.03	27	.52
First tier of counties	Berrien. Cass. St. Joseph. Branch.	Hillsdale. Lenawee. Monroe.	231,167	472	20.42	8	.35

* Population estimated by average annual increase (arithmetical method), based on U. S. Census of 1890 and the State Census of 1894. Computed in the Office of the State Board of Health.

TABLE 4.—*Numbers of Cases and Deaths reported from Scarlet Fever per 10,000 persons living in each county in Michigan during the year 1895. (Compiled from reports of health officers, clerks, etc.)*

State and counties.	Estimated Population of Michigan for 1895.*	Number of reported		Number per 10,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.
State	2,278,579	3,908	125	17.15	.55
Alcona	5,420	0	0	0	0
Alger	1,422	0	0	0	0
Allegan	39,246	15	0	3.82	0
Alpena	18,251	20	1	10.96	.55
Antrim	12,931	10	0	7.73	0
Arenac	7,258	12	0	16.53	0
Baraga	4,531	1	0	2.21	0
Barry	23,678	45	0	19.00	0
Bay	62,527	17	0	2.72	0
Benzie	8,770	0	0	0	0
Berrien	46,723	70	3	14.98	.64
Branch	26,061	26	0	9.97	0
Calhoun	48,465	71	0	14.65	0
Cass	21,232	29	0	13.66	0
Charlevoix	11,464	0	0	0	0
Cheboygan	14,379	0	0	0	0
Chippewa	16,148	199	24	123.24	14.86
Clare	8,081	0	0	0	0
Clinton	26,200	52	1	19.85	.38
Crawford	2,647	0	0	0	0
Delta	20,245	16	1	7.90	.49
Dickinson	14,887	8	1	5.37	.67
Eaton	32,749	77	3	23.51	.92
Emmet	11,312	13	0	11.49	0
Genesee	40,834	273	1	66.86	.24
Gladwin	5,073	5	0	9.86	0
Gogebic	14,312	8	1	5.59	.70
G'd Traverse	18,555	0	0	0	0
Gratiot	28,803	44	0	15.28	0
Hillsdale	30,175	52	1	17.23	.33
Houghton	46,338	165	4	35.61	.86
Huron	33,184	16	2	4.82	.60
Ingham	40,195	20	0	4.98	0
Ionia	35,325	152	1	48.69	.28
Iosco	11,619	1	0	.86	0
Iron	5,360	23	1	42.91	1.87
Isabella	22,103	5	0	2.26	0
Jackson	46,911	59	1	12.58	.21
Kalamazoo	42,752	159	5	37.19	1.17
Kalkaska	5,760	1	0	1.74	0
Kent	124,942	268	6	21.45	.48
Counties.					
Keweenaw	2,783	2	0	7.18	0
Lake	5,745	5	0	8.70	0
Lapeer	28,795	22	0	7.64	0
Leelanau	9,938	4	0	4.02	0
Lenawee	48,564	175	3	36.03	.62
Livingston	20,332	15	0	7.38	0
Luce	2,321	2	0	8.62	0
Mackinac	7,089	15	1	21.16	1.41
Macomb	32,531	75	0	23.05	0
Manistee	26,585	3	0	1.13	0
Marquette	38,490	50	1	12.99	.26
Mason	18,931	6	0	3.17	0
Mecosta	20,987	34	3	16.25	1.43
Menominee	24,041	52	0	21.63	0
Midland	13,858	5	0	3.61	0
Missaukee	7,432	1	0	1.35	0
Monroe	33,392	49	0	14.68	0
Montcalm	34,538	88	2	25.48	.58
Montmorency	2,676	40	0	149.48	0
Muskegon	36,652	86	5	23.46	1.36
Newaygo	18,787	32	4	17.03	2.13
Oakland	43,034	61	1	14.17	2.32
Oceana	16,824	75	6	45.17	3.57
Ogemaw	5,652	0	0	0	0
Ontonagon	7,652	4	0	5.23	0
Osceola	16,936	15	0	8.86	0
Oscoda	1,781	0	0	0	0
Otsego	4,925	4	0	8.12	0
Ottawa	40,014	38	0	9.50	0
Presque Isle	6,217	0	0	0	0
Roscommon	1,563	0	0	0	0
Saginaw	81,740	36	0	4.40	0
Sanilac	34,284	17	2	4.96	.58
Schoolcraft	7,454	17	0	2.28	0
Shiawassee	33,330	155	3	46.50	.90
St. Clair	54,875	213	13	38.82	2.37
St. Joseph	25,020	71	1	28.38	.40
Tuscola	34,888	17	2	4.87	.57
Van Buren	31,189	102	6	32.70	1.96
Washtenaw	43,834	13	0	2.97	0
Wayne	301,298	369	15	12.25	.50
Wexford	14,739	8	0	5.43	0

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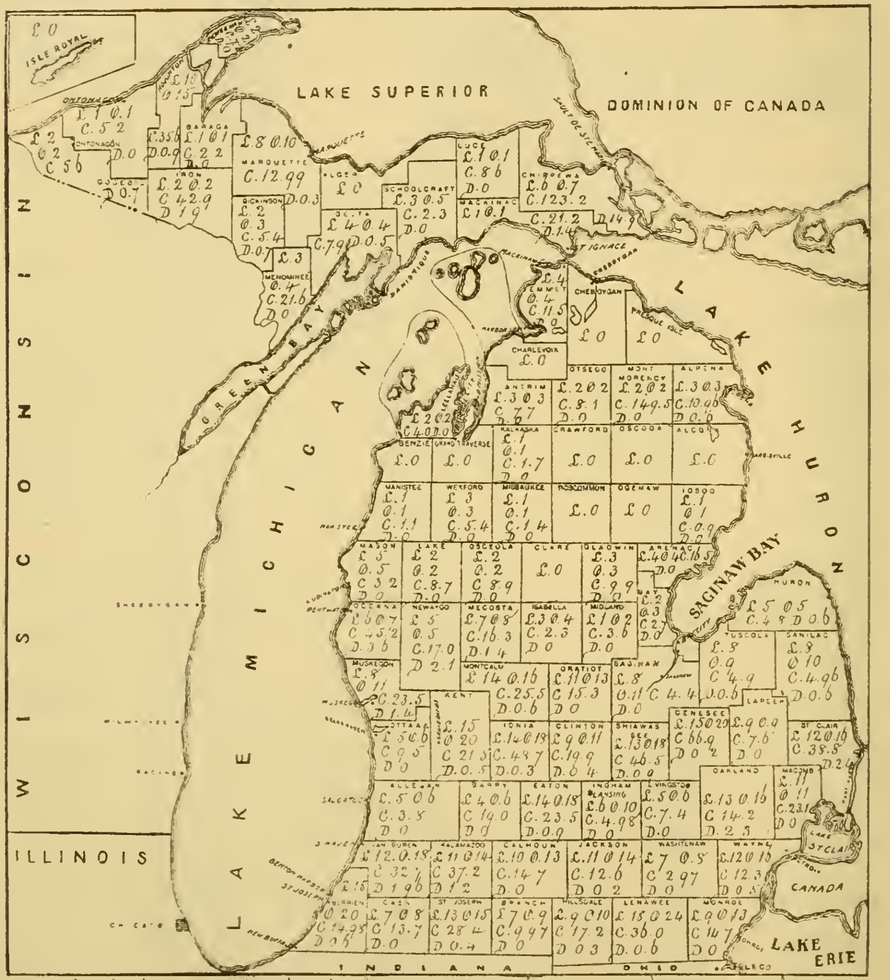
* Population estimated by average annual increase, arithmetical method, based on U. S. Census of 1890 and the State Census of 1894; computed in the Office of the State Board of Health.

DISTRIBUTION OF SCARLET FEVER IN MICHIGAN IN 1895.
BY COUNTIES, THE REPORTED CASES AND DEATHS PER 10,000 INHABITANTS.



L = Localities, O. = Outbreaks. C = Cases per 10,000 population; D = Deaths per 10,000 population

[PLATE 177]

The sickness-rates and death-rates shown in the map on the preceding page agree with those in Table 4, except that in some instances but one decimal place could be used on the map, while in the table the sickness and death-rates are carried out to the second decimal place.

Sickness-rates from Scarlet Fever in 1895, by tiers of Counties.

Table 3 exhibits the latitudinal distribution of scarlet fever reported throughout the State, by tiers of counties; all the counties of the Upper Peninsula considered as one tier. By this table (3) it appears that the greatest reported prevalence of scarlet fever was in the fourth tier, where the sickness rate was 30.52 cases per 10,000 inhabitants, which was nearly double the average reported prevalence for the whole State, (17.15 cases per 10,000) and, with the exception of the Upper Peninsula with 26.38, and the first tier, with 20.42 cases per 10,000 inhabitants, was nearly twice as great as that in any other tier of counties.

In the ninth tier of counties, with a population of 42,933, only one case of scarlet fever was reported to have occurred. (This case was reported to have been imported into that locality, and restrictive measures were thoroughly enforced in this instance, which may account for no more cases having occurred in that immediate locality.) The eighth, eleventh and seventh tiers of counties were next in lowest sickness-rates, they being respectively, 1.92, 3 00, 4.82 cases per 10,000 inhabitants.

Table 4 shows the greatest sickness-rate reported from this disease in 1895 was in Montmorency county, where the ratio of cases to population was 149.48 per 10,000. Other counties where the reported sickness-rates were largely in excess of the average for the State, were:—Chippewa, 123.24; Genesee, 66.86; Ionia. 48.69; Shiawassee, 46.50; Oceana, 45.17; Iron, 42.91; St. Clair, 38.82; Kalamazoo, 37.19; Lenawee, 36.03; Houghton, 35.61; Van Buren, 32.70, cases per 10,000 inhabitants.

The lowest reported sickness-rate for the year, .86 of one case per 10,000 inhabitants, was in Iosco county. In 27 other counties, where scarlet fever was reported, the sickness-rates were less than one-half the average rate for the State. Of these counties, Manistee, 1.13; Missaukee, 1.35; Kalkaska, 1.74; Baraga, 2.21; Isabella, 2.26; Schoolcraft, 2.28; Bay, 2.72; Washtenaw, 2.97, cases per 10,000 inhabitants, ranked lowest. From the following twelve counties, Alcona, Alger, Benzie, Charlevoix, Cheboygan, Clare, Crawford, Grand Traverse, Ogemaw, Oscoda, Presque Isle and Roscommon,—having an aggregate population of 85,951—no scarlet fever was reported during the year.

The sickness-rate in the second tier of counties, as may be seen in the table, was 15.03 cases per 10,000 inhabitants. In the city of Detroit, situated in this tier, the rate was 12.76, per 10,000 inhabitants, and in this tier excluding Detroit, the rate was 17.17, per 10,000 inhabitants.* In the fourth tier of counties, in which is situated the city of Grand Rapids, the sickness-rate was 30.52 per 10,000 inhabitants. In the city of Grand Rapids the rate was 23.13 per 10,000 inhabitants, and in the tier of counties excluding Grand Rapids it was 32.47 cases per 10,000 inhabitants.* It is thus shown that in 1895 the sickness-rates from scarlet fever in Detroit and Grand Rapids are lower than those for the tiers of counties in which they are situated, and lower than the average for the whole State. The experience of several years previous to 1894, has shown the reverse of this, the rates in these cities having in those years been much higher than in their tiers of counties, and in the State.

Death-rates from Scarlet Fever in 1895, by tiers of counties.

Table 3 shows that the greatest death-rate reported from this disease, 1.60 per 10,000 inhabitants, was in the Upper Peninsula. The sixth tier of counties, with 1.40 per 10,000 inhabitants, having the next highest death-rate. No deaths were reported from the eleventh, ninth, and eighth tiers.

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* The Boards of Health of the cities of Detroit and Grand Rapids stated the population of these cities, in 1895, as 250,000 and 80,000, respectively. These numbers were used in making these calculations.

The lowest reported death-rate, .13 of one death per 10,000 inhabitants, was in the seventh tier. The third and tenth tiers, with .17, and 21 of one death per 10,000 inhabitants, having the next lowest death-rates.

Table 4 shows that the greatest reported death-rate from scarlet fever during the year, 14.86 deaths per 10,000 inhabitants, was in Chippewa county. Other counties where the reported death-rates were greatly above the average death-rate for the State were: Oceana, 3.57; St. Clair, 2.37; Oakland, 2.32; Newaygo, 2.13; Van Buren, 1.96; Iron, 1.87; Mecosta, 1.43; Mackinac, 1.41; Muskegon, 1.36; Kalamazoo, 1.17, deaths per 10,000 inhabitants.

In 38 counties, from which an aggregate of 731 cases of scarlet fever were reported, there were no deaths from this disease reported. The lowest reported death-rate, .21 of one death per 10,000 inhabitants, was in Jackson county. Other counties where the reported death-rates were far below the average for the State were: Genesee, .24; Marquette, .26; Ionia, .28; Hillsdale, .33; Clinton, .38, of one death per 10,000 inhabitants.

Fatality from Scarlet Fever in 1895, in Michigan, and by counties.

The fatality from scarlet fever in 1895,—*i. e.*, the proportion of reported cases which proved fatal, was, for the whole State, 3.2 per cent, or about one death to 31 cases. In Dickinson, Gogebic, Huron, and Newaygo counties, the fatality was the same, 12.50 per cent of reported cases. In Chippewa and Tuscola counties the fatality was over three times the average fatality for the State. The minimum fatality, in counties from which deaths were reported, .4 of one per cent of reported cases. occurred in Genesee county. Other counties where the fatality was considerably less than the average for the State were: Ionia, .66, of one case, and St. Joseph, 1.40; Oakland, 1.64; Jackson, 1.70; Lenawee, 1.72, per cent of reported cases.

Scarlet Fever in Each Month of the Year, 1895.

TABLE 5.—*Exhibiting the reported number of outbreaks of Scarlet Fever which Began, the number which Ended, and the number which were Present, in each Month of the Year 1895, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept	Oct	Nov.	Dec.	Year.
Number began	111	47	38	43	37	28	36	26	27	41	45	39	518
Number ended	21	47	55	47	32	40	29	30	28	16	40	62	447
Number present	132	143	135	119	104	96	90	86	80	86	110	108	....

The last line of figures in Table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. Frequently the beginning of an outbreak is reported but the end of the outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months. There were 71 more beginnings than endings of outbreaks reported during the year 1895.

TABLE 6.—*Exhibiting the Number and Per Cent of Cases of Scarlet Fever in Michigan in each Month during the Year 1895. (Includes each case for which the time during which it existed, was stated in the reports. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.)*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number of cases sick in any part of the month	526	552	478	365	321	293	209	185	160	280	424	418
Per cent the cases sick in each month were of total reported cases	13	14	12	9	8	7	5	5	4	7	11	11

The first line of figures, in Table 6, shows the number of cases reported sick in any part of each month.

As some of the cases were sick longer than one month they are included in the cases sick in more than one month, therefore the sum of the cases sick in all the months exceeds the total of reported cases in 1895; and the sum of the last line of figures in Table 6 exceeds 100.

The last line of figures, in this table, shows the per cent the cases sick in each month are of the exact number of cases *reported* to this office for the year 1895.

Source of Contagium of Scarlet Fever, How the Disease is Spread, and the Vitality of the Contagium.

Of the 3,908 cases of scarlet fever reported during the year 1895, as exhibited in the following table, the local health officers reported the source of contagium, as follows: Traced to a former case, 1,006; probably traced to a former case, 41; attributed to infected houses, articles, clothing, etc., 15; attributed to unsanitary conditions, 7; source of contagium unknown, 2,312; source of contagium not stated, 416; traced to an outside jurisdiction, 73; probably from an outside jurisdiction, 38.

TABLE 7.—*Reported Source of Contagium of Cases of Scarlet Fever, in 1895.*

	Cases.
Traced to a former case	1,006
Probably traced to a former case	41
Attributed to infected houses, articles, clothing, etc.	15
Attributed to unsanitary conditions	7
Source of contagium unknown, or reports not definite (including "Exposure," "Contagium," "Endemic" and "Sporadic")	2,312
Source of contagium not stated	416
Traced to outside jurisdictions	73
Probably from an outside jurisdiction	38
All cases	3,908

Cases of Scarlet Fever Traced to a Former Case.

Table 7 shows that of the 3.908 reported cases of scarlet fever in this State in 1895, 1,006 were reported traced to a former case of the disease. The following extracts are from a few of the health officers' reports in which the cases were traced to a former case in the same jurisdiction; and further on in this article are extracts from health officers' reports in which cases of the disease were traced to some definite outside jurisdiction.

"In the first cases the children were sent to school too soon."—*F. Shillito, M. D., Marcellus village, Cass county.*

"One case was taken down seriously in school and was sent home."—*W. B. House, M. D., Detour township, Chippewa county.*

"It was of a mild form and cases at first without a physician were not reported, consequently patients were at large, not quarantined, thus the disease spread from desquamation."—*E. C. Palmer, M. D., Charlotte city, Eaton county.*

"By contact with those sick with the same."—*Chas. S. Snell, M. D., Vermontville village, Eaton county.*

"Came by associating with neighbor's children who had the disease and did not employ a physician."—*O. W. Tock, M. D., Flushing township, Genesee county.*

"Do not know how or where the first case was exposed. The rest took it from the first case."—*F. A. Hargrave, M. D., Ronald township, Ionia county.*

"From a case in the neighborhood and not reported until all were about."—*Byron Defendorf, M. D., Handy township, Livingston county.*

"From former cases"—*Geo. G. Barnett, M. D., Ishpeming city, Marquette county.*

"All from a mild case in school."—*F. H. Sowers, Elbridge township, Oceana county.*

"Mr. C—'s two children contracted it from him."—*F. S. Love, M. D., Vernon township, Shiawassee county.*

"Several mild cases ran free before disease was 'named.' First investigation found child 'pealing' on the streets of the little village."—*B. M. Porter, M. D., Nottaway township, St. Joseph county.*

"First case came home from school complaining of sore throat, etc. Two others in the family had scarlet fever shortly after."—*F. J. Clippert, M. D., Springwells township, Wayne county.*

"This little patient caught it at school. Some children went to school all broken out, were not sick, but, as soon as I heard of it, I posted the teachers so they could send them home."—*A. T. Getchell, M. D., Mt. Pleasant city, Isabella county.*

"Nurse in household No. 1 went to door of house No. 2 while patient was desquamating and carried the disease."—*J. W. Cooper, M. D., Wyoming township, Kent county.*

Source of Scarlet Fever Unknown or Reports Indefinite.

The following extracts are taken from a few of the health officers' reports in which the source of contagium of cases was reported as unknown, or reports were not definite:—

"Contagium."—*S. S. Stout, M. D., Cheshire township, Allegan county.*

"Don't know, but think was exposed while traveling on the cars."—*E. R. Espie, M. D., Potterville village, Eaton county.*

"The parties had not been away any place and there had been no other cases in the vicinity."—*F. Taylor, M. D., Fulton township, Gratiot county.*

"Exposure."—*Grant Ide, M. D., Oshtemo township, Kalamazoo county.*

"Impossible to give source."—*D. W. La Furgey, Clayton village, Lenawee county.*

Scarlet Fever Attributed to Unsanitary Conditions.

"Filth."—*J. M. Totten, clerk, Howard City, Montcalm county.*

"House low and old and banking not removed."—*Chas. L. Schmidt, M. D., Escanaba city, Delta county.*

Duration of the Vitality of the Scarlet Fever Germ.

The germ of scarlet fever is not yet demonstrated; but that there is a germ seems to be proved by the known communicability of the disease.

The following extracts from the reports of health officers and physicians indicate that the scarlet fever germ frequently retains its vitality for a long time outside of the human body, in an apparently dormant or inactive state, in houses, clothing, carpets, furniture, etc., and is then capable of developing scarlet fever in persons coming into such houses or in contact with or near such articles, thus showing the importance of carefully disinfecting all infected houses and articles, even where they are not to be used for a long time:—

"From some disinfected clothing."—*F J. Ford, Maple Grove township, Barry county.*

"Think it came from rags from paper mill."—*W. L Garratt, M. D., Watervliet village, Berrien county*

"Through a letter."—*H. F. Smith, M. D., Weesaw township, Berrien county.*

"This family moved here from near Williamston and into a house here that one and one-half years ago had a case of scarlet fever."—*John C. Oding, Riley township, Clinton county.*

"A child had scarlet fever a year ago; its socks were put into a trunk and left until recently when they were got out and placed upon another babe. In one week the babe became sick with fever and sore throat, in two days more the rash came out, it remained three days, the babe is now exfoliating." —*I. N. Brainerd, Alma village, Gratiot county.*

"Mrs. —— went to visit friends and found them with scarlet fever. She returned, after three months did a family washing for E——. His boy of ten years took fever when wearing clothes she washed."— —*W. McBurney, M. D., Duncan township, Houghton county.*

"In the house two years before which was never reported and the house not fumigated."—*E. E. Curtis, M. D., Saginaw, W. S., Saginaw county.*

"Believed to be by wearing clothing worn by person that had scarlet fever the previous winter."—*Patrick Shea, Cottrellville township, St. Clair county.*

"Mr. S—— went to Mr. C—'s house to take care of children while Mr. C—'s folks were away. The fifth day one of their children came down with scarlet fever. Mr. C—'s children had scarlet fever about six months ago."—*John C. Oding, Riley township, Clinton county.*

Outbreaks of Scarlet Fever Traced to an Outside Jurisdiction.

The following are extracts from the reports of health officers who were able to trace the outbreaks of scarlet fever in their respective jurisdictions to cases of the disease outside their jurisdictions,—with the name of the health officer and of the jurisdiction subjoined. These quotations concerning the spread of contagium from first to second, from second to third, and even to fourth localities, are arranged in the same order as the "First Localities" in the first column of Table 8, thus giving the source of each report. The consecutive numbers placed before these quotations refer to similar numbers in the first column of Table 8 of this article.

1. "Came from Alpena where child had been visiting."—*William Kerr, M. D., Bay City, Bay county.*

1.5 "From the city of Alpena."—*J. H. Harwood, M. D., clerk, Hillman township, Montmorency county.*

2. "The person was visiting in Barry county, came home, was taken sick the next day."—*Phillip Bowers, Pennfield township, Calhoun county.*

3. From "Lincoln Tp."—*Burritt S. Bedoetha, clerk, Lake township, Berrien county.*

4. "Caught in Pipestone Tp."—*Lewis W. Ruggles, Hagar township, Berrien county.*

5. "Child came from Battle Creek with her parents visiting."—*H. C. Webster, clerk, Emmet township, Calhoun county.*

6. "From Dowagiac."—*Samuel Stevens, M. D., Keeler township, Van Buren county.*

7. From "village of Marcellus."—*E. Shillito, M. D., Marcellus township, Cass county.*

7. "Visitors from Marcellus."—*A. W. Scidmore, M. D., Three Rivers city, St. Joseph county.*

8. "Direct contact with patient from Edwardsburg." [Ontwa Twp.]—*W. C. McCutcheon, M. D., La Grange township, Cass county.*

9. "From Detour."—*G. Willoughby, Drummond township, Chippewa county.*

9. "Carried from Detour."—*D. H. Webster, M. D., Pickford township, Chippewa county.*

9. "From Pickford Twp "—*L. R. Adamson, Rudyard township,* Chippewa county.*

10. "It was brought from the adjoining township of Clayton."—*Thos. H. Nesbitt, Flint township, Genesee county.*

11. "From Flint "—*E. D. Gardner, M. D , Davison township, Genesee county.*

11. "Contracted it while in Flint "—*L. A. Steele, M. D., Flushing village, Genesee county.*

11. "Brought from Flint."—*S. D. Hinman, M. D., Sparta village, Kent county.*

11. "Child came here from Flint with her parents visiting and was taken sick."—*J. C. Weimeister, Genoa township, Livingston county.*

12. "From a child visiting a family in Flushing Tp "—*J. S. Shoemaker, M. D., Hazelton township, Shiawassee county.*

13. "It was brought here from Montrose."—*J. A. Judson, M. D., New Haven township, Shiawassee county.*

13. "A child came here from New Haven and came down while visiting here."—*J. S. Shoemaker, M. D., Hazelton township,* Shiawassee county.*

14 "Had relatives living in the Tp. of Mt. Morris, Genesee Co. This girl went there visiting, and the family had had scarlet fever six weeks previous."—*Thos. H. Nesbitt, Flint township, Genesee county.*

15. "From Richfield Tp."—*E. D. Gardner, M. D., Davison township, Genesee county.*

15. "Patient contracted the disease at Richfield, Genesee Co."—*Geo. W. MacKinnon, M. D., Orion township, Oakland county.*

16. "I am convinced, was taken from a light case in Arcada Tp., where they were visiting."—*J. F. Suydam, M. D., Alma village, Gratiot county.*

16. "Was brought from Arcada Tp."—*G. A. Ligiman, M. D., Ithaca village, Gratiot county.*

17. "From North Star Tp."—*J. A. Hart, Ex. H. O., Ithaca township, Gratiot county.*

18. From "Allen Tp."—*Wm. Bishop, Hillsdale township, Hillsdale county.*

19. "There is scarlet fever almost constantly in the neighboring Tp. of Calumet, and there is much intercourse in various ways which gives rise to new cases."—*A. J. Lawbaugh, M. D., Osceola township, Houghton county.*

19. "From Calumet."—*Jno. MacRae, M. D., Sherman township, Keweenaw county.*

20. "Brought from the Tp. of Bloomfield."—*Chas. Fuller, Sigel township, Huron county.*

21. "By a girl working as a domestic in Lansing. She was taken down there and as soon as she was able to sit up the doctor sent her home without informing her what the sickness was, and she gave it to four children."—*Tyler Hull, M. D., Windsor township, Eaton county.*

22. From "Tp. of Locke."—*H. P. Halstead, M. D., Perry township, Shiawassee county.*

23. From "Lake Odessa, Mich."—*W. H. Landis, M. D., Campbell township, Ionia county.*

24. "By blowing a horn that he bought of —— of Muir, Mich."—*G. W. Chase, Ionia township, Ionia county.*

25. "From the township of Odessa."—*W. H. Landis, M. D., Campbell township, Ionia county.*

26. "Brought from Otisco Tp."—*J. S. Morris, M. D., Belding city, Ionia county.*

26. "Undoubtedly from the clothing worn by a lady who had been caring for children sick with scarlet fever in Belding."—*Wm. Bell, M. D., Otisco township,* Ionia county.*

27. "By contagium from a family in Columbia Tp."—*F. R. Crosby, M. D., Napoleon township, Jackson county.*

28. From "city of Kalamazoo."—*B. M. Thomas, Kalamazoo township, Kalamazoo county.*

29. "Contracted, Rapid River."—*D. C. Whitney, M. D., Masonville township, Delta county.*

30. "From visiting a family in cannon Tp. where there had been cases of this disease recently."—*G. M. Spencer, M. D , Grattan township, Kent county.*

31. "From Rockford and Cedar Springs."—*John B. Dewar, M. D., Solon township, Kent county.*

32. "From Grand Rapids."—*B. M. Thomas, Kalamazoo township, Kalamazoo county.*

32. "The child was taken while here on a visit from Grand Rapids."—*Van N. Miller, M. D., Fremont village, Newaygo county.*

32. "From the city of Grand Rapids."—*J. W. Van den Berg, M. D., Holland township, Ottawa county.*

33. "From exposure to cases in Chase Tp., Lake county."—*A. T. Wightman, Barton township, Newaygo county.*

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* Third locality infected from second, shown in Table 8.

33. "Mrs. ——— and children visited friends in Newaygo Co. [Barton Tp.], where there had been scarlet fever about three months before and her child came down with it five days after her return home."—*N. I. Archbold, Rose Lake township,* Osceola county.*

34. "Case came from Glencoe Tp."—*Earl Fairbanks, M. D., Luther village, Lake county.*

35. "Carried on person from Blissfield."—*A. O. Wotring, M. D., Ogden township, Lenawee county.*

36. "From Clayton village."—*E. Bates, Dover township, Lenawee county.*

36. "Patient had been visiting at Clayton."—*O. N. Rice, M. D., Franklin township, Lenawee county.*

36. "First case was exposed in Clayton."—*E. J. Ross, M. D., Rome township, Lenawee county.*

36. "It came from the Tp. of Rome, Lenawee Co."—*Wm. B. Town, M. D., Rollin township,* Lenawee county.*

37. From "Hudson."—*C. W. Harris, M. D., Hillsdale city, Hillsdale county.*

38. "Brought from Riga Tp. by a child who had been visiting in a house where shortly before they had scarlet fever."—*C. A. Bell, M. D., Whiteford township, Monroe county.*

39. "First patient slept in a bed near Hartland, Mich., where a patient had been sick with scarlet fever a year previous, in two weeks taken sick with the same."—*Frank S. Love, M. D., Vernon township, Shiawassee county.*

40. "From a case in Iosco Tp."—*Byron Defendorf, M D., Handy township, Livingston county.*

41. "Had been visiting friends in Mt. Clemens city, where they had the disease, but after the house had been fumigated."—*A. Stewart, M. D., Hamtramck township, Wayne county.*

42. "A woman visiting in Macomb Co."—*Frank Shoup, Oakland township, Oakland county.*

43. From "Manistee."—*R. McDermott, M. D., LeRoy township, Osceola county.*

44. "While working as a domestic in Big Rapids."—*Wm. Northrup, M. D., Wheatland township, Mecosta county.*

45. "On a visit in the town of Dundee."—*Moses J. Howe, Milan township, Monroe county.*

46. "By contagium brought from Greenville."—*Henry Tremayne, M. D., Ionia city, Ionia county.*

47. From "Stanton."—*A. McComb, clerk, Evergreen township, Montcalm county.*

48. "Brought from Bradley's mill." [Montcalm Co.]—*C. J. Annes, M. D., Nelson township, Kent county.*

48. "From visiting in Montcalm Co. with friends that had scarlet fever."—*M. H. Boyd, Deerfield township, Mecosta county.*

49. "Contracted in the village of Hillman."—*Robert Kincaid, clerk, Rust township, Montmorency county.*

50. "Brought from Fruitport."—*F. W. Heysett, M. D., Free Soil township, Mason county.*

51. "Mrs. —, a huckster, contracted scarlet fever in Muskegon in last of March, 1895, and two daughters were taken ten days later. Visited in the village of Muskegon Heights."—*Michael Mason, M. D., Muskegon Heights village, Muskegon county.*

51. From "Muskegon."—*Michael Mason, M. D., Muskegon Heights village, Muskegon county.*

52. "First brought from Milford in Sept., and, in spite of isolation, it kept in the jurisdiction until now."—*A. G. Cowles, M. D., Durand village, Shiawassee county.*

52. "The disease was undoubtedly contracted in the village of Durand as patient was attending school there during outbreak of scarlet fever at said place."—*W. L. Dennison, M. D., Vernon township,† Shiawassee county.*

53. "From a family in Maple Grove Tp , Saginaw Co."—*J. S. Shoemaker, M. D., Hazleton township, Shiawassee county.*

54. "From Marlette school."—*A. Mitchell, M. D., Koylton township, Tuscola county.*

55. "Was exposed to the disease in school in the village of Vernon."—*Wm. H. White, Venice township, Shiawassee county.*

55. "By an infected person coming from a recent case of scarlet fever in Vernon village."—*W. L. Dennison, M. D., Vernon township, Shiawassee county.*

56. "Exposed at Marine City."—*Jay J. Delbridge, M. D., acting health officer, Algonac village, St. Clair county.*

56. "Taken from Marine City."—*Patrick Shea, Cottrellville township, St. Clair county.*

56. "E——— caught the disease from parties in Marine City."—*Patrick Shea, Cottrellville township, St. Clair county.*

57. "A young lady from the town of St. Clair stopping where they had scarlet fever came to an evening party and it is reported gave it to the children."—*Daniel M. Dayton, Columbus township, St. Clair county.*

58. "Trading at Constantine."—*J. W. B. Fort, M. D., Mottville township, St. Joseph county.*

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* Third locality infected from second, shown in Table 8.

59. "From scholars attending school from the township of Geneva, as near as I could learn."—*M. E. Bishop, M. D., South Haven village, Van Buren county.*

60. "Outbreak from the village of Hartford."—*Samuel Stevens, M. D., Keeler township, Van Buren county.*

61. "By visiting a house in Ann Arbor Tp. where scarlet fever had been a few months before and the house not properly renovated and disinfected."—*Guy L. Laraway, M. D., Northfield township, Washtenaw county.*

62. "G—— who was a student at Ypsilanti came home sick."—*W. S. Morden, M. D., Macon township, Lenawee county.*

63. "A Detroit family with children convalescent from said disease visited at the home of family about one and one-half miles north of the village."—*Norman Johnson, M. D., Birmingham village, Oakland county.*

63. From "Detroit."—*Frank J. Ford, clerk, Greenfield township, Wayne county.*

64. "Visiting relatives in Plymouth."—*Henry F. Horner, Canton township, Wayne county.*

65. "Contracted at school in Liberty Tp."—*V. F. Huntley, M. D., Cedar Creek township, Wexford county.*

66. "Child from western part of the State taken sick while here on a visit."—*A. D. Bangham, M. D., Homer village, Calhoun county.*

Outbreaks in Michigan Traced to Outbreaks Outside of the State.

67. "Family visited a place in Canada where they had scarlet fever a year before."—*A. Price, M. D., Almont township, Lapeer county.*

68. From "Chicago."—*M. E. Bishop, M. D., South Haven village, Van Buren county.*

69. "Brought from Dakota."—*Chas. Wunch, M. D., Boston township, Ionia county.*

70. "First case came into Rives Tp. from the city of Boston, Mass., where there was an epidemic of scarlet fever in progress, but was not taken with the disease until after arriving here."—*Geo. H. Townsend, M. D., Rives township, Jackson county.*

71. "Family moved from Nebraska where a like disease prevailed called German measles. In a few days a brother's children came down with the disease in school."—*C. W. Marvin, M. D., Newark township, Gratiot county.*

72. "This family moved here from New York in the last week of June."—*P. C. Dube, M. D., Manistique village, Schootcraft county.*

72. "Landed at New York, Mar. 2, from steamer, 'City of New York' and reached Ishpeming, Mar. 5."—*Geo. G. Barnett, M. D., Ishpeming city, Marquette county.*

73. "Brought from Bairdstown, Woods Co., Ohio."—*M. C. Cate, Solon township, Leelanaw county.*

74. "Brought from Ohio."—*S. O. Turbett, M. D., Palmyra township, Lenawee county.*

75. From "Ellis Junction, Wis."—*J. F. Menistrina, M. D., Iron Mountain city, Dickinson county.*

Outbreaks Probably Traced to Former Outbreaks.

76. "Unknown, but probably carried from a case sick in Nashville."—*W. H. Young, M. D., Castleton township, Barry county.*

77. "Thought to have been through clothing brought from Benton Harbor."—*J. W. Gunn, M. D., Watervliet township, Berrien county.*

78. "The first case was supposed to have been caught at a dance in Weesaw Tp."—*Clifford E. Hugins, M. D., Lake township, Berrien county.*

79. "Supposed to have come from Bronson village."—*Chas. M. Thompson, Mattison township, Branch county.*

80. "We have concluded that the disease was brought here in a sack of dried sweet corn. The corn was dried and prepared in a house in Watertown Tp., Clinton Co., where there was scarlet fever."—*J. W. Ewing, Oneida township, Eaton county.*

81. "Some other member of family had this disease at Davison, Mich. The family moved here probably bringing it with them."—*Geo. Simenton, M. D., Marlette village, Sanilac county.*

82. "Caught, probably, from a case in Flint Tp. called scarlet rash and pronounced by the physician as not catching."—*A. B. Clark, M. D., Clayton township, Genesee county.*

83. "Probably by a sister who had been living in Calumet Tp."—*James Hosking, M. D., Allouez township, Keweenaw county.*

84. "Can't tell where the case originated, but think from Lansing by parents visiting a family that had it."—*E. P. North, M. D., Delhi township, Ingham county.*

84. "Supposed to have been brought in from Lansing."—*Z. W. Waldron, M. D., Jackson city, Jackson county.*

85. "Supposed by family to have been brought from Onondaga."—*Z. W. Waldron, M. D., Jackson city, Jackson county.*

86. "It was claimed to be brought by a lady that previously had nursed children sick with scarlet fever in Iron River Tp. She was claimed to have infected hair."—*August Erickson, Bates township, Iron county.*

87. "The patient visited the city, [Jackson] and did shopping nine days before being taken sick."—*C. H. Hosking, M. D., Leoni township, Jackson county.*

88. "Do not know, but supposed to have been brought from Jackson Co."—*R. C. Traver, M. D., Somerset township, Hillsdale county.*

89. "Supposed to have been taken at a party in Texas Tp."—*Henry C. Ames, Portage township, Kalamazoo county.*

90. "Supposed to have been brought here from Rockford, Mich., and carried to public school."—*L. Swanton, M. D., Cedar Springs village, Kent county.*

91. "Caught, no doubt, from case in Sand Lake village."—*A. R. Hicks, M. D., (H. O. of Sand Lake Vil.) Nelson township, Kent county.*

91. "It was contracted at Sand Lake while on a visit, or supposed to be."—*J. T. Kilburn, M. D., Maple Valley township, Montcalm county.*

92. "Supposed to be Ogden Tp."—*M. A. Jerome, M. D., Fairfield township, Lenawee county.*

93. "Not known, supposed to come from Rome Tp. where this disease was epidemic."—*G. W. Ross, M. D., Cambridge township, Lenawee county.*

93. "Mrs. B —— thinks that she and the children were exposed by visiting a family in Rome Tp. where they had scarlatina last winter."—*E. J. C. Ellis, M. D., Clayton village, Lenawee county.*

93. "Probably from some house in the village of Clayton."—*E. J. C. Ellis, M. D., Hudson township,* Lenawee county.*

94. "As near as we can find out it was taken in Stanton."—*W. G. Palmer, Sidney township, Montcalm county.*

95. "Supposed, Clarkston, Oakland Co."—*B. F. Miller, Brandon township, Oakland county.*

96. "Brought from where last lived, I think, Walled Lake."—*J. W. Losee, M. D., Pontiac city, Oakland county.*

97. "Supposed to have been brought from Orion Tp."—*S. B. Robb, M. D., Addison township, Oakland county.*

98. "Supposed to have been a child who had been to Owosso visiting."—*A. T. Parrish, M. D., Byron village, Shiawassee county.*

98. "Cause not known, although I think by exposure to previous cases at Owosso."—*L. R. Lumby, M. D., Rush township, Shiawassee county.*

99. "Supposed to have come from the employment of a servant coming from St. Clair."—*E. Bruce Keeler, M. D., Richmond township, Macomb county.*

100. "The first case seems to have originated from contact with a person from Marine city."—*W. E. Bostwick, M. D., Algonac village, St. Clair county.*

101. "Probably from parties calling at the home of —— in Colon Tp."—*B. M. Porter, M. D., Nottaway township, St. Joseph county.*

102. "Probably from Leonidas Tp."—*Edwin Stewart, M. D., Mendon village, St. Joseph county.*

103. "From previous mild cases occurring in children living at Sturgis who visited here. This is the supposed source."—*E. A. Planck, M. D., Porter township, Cass county.*

104. "Supposed from Caro."—*J. T. Kane, Almer township, Tuscola county.*

105. "Think it was brought from Detroit through his niece who was visiting here. Had slight rash and sore throat."—*J. W. Losee, M. D., Pontiac city, Oakland county.*

106. "The patient came from Cadillac a few days before she was taken sick and did not know of being exposed to scarlet fever."—*R. S. Trask, M. D., Kalkaska village, Kalkaska county.*

Outbreaks in Michigan Probably Traced to Outbreaks Outside the State.

107. "There was a child in the neighborhood visiting who had the disease in Canada, and was supposed to be well, and it was supposed to have originated in that way."—*Wm. T. Banting, M. D., Lexington township, Sanilac county.*

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* Third locality probably infected from second, shown in Table 8.

107. "Came, I believe, from the home of ——— half a mile north of the village."—*T. S. Kingston, M. D., Croswell village,* Sanilac county.*

108. "Supposed to be brought from exposure in Minneapolis, Minn."—*A. L. Canaan, Grant township, Mecosta county.*

109. "Just returned from a visit to New York."—*F. W. Neal, M. D., Newberry village, Luce county.*

110. "Supposed to have been been brought from Toledo, Ohio."—*W. H. Holtzman, M. D., Vernon village, Shiawassee county.*

111. "From Ohio?"—*H. H. Merriman, M. D., Plymouth village. Wayne county.*

Movements of Contagium of Scarlet Fever.

The following Table (8) and Map, "Movements of Contagium," show the sources and direction of movements of scarlet fever in Michigan, where the contagium was reported by health officers to have been introduced into their jurisdictions from localities outside the State, or from other jurisdictions within the State.

On the Map, the spread of scarlet fever in Michigan as reported to this Office in the year, 1895, is shown by black lines which connect the localities; the arrow-head indicates the direction of the movement in each case. The source of this information is given in the preceding list of "extracts from reports of health officers," with the name and address of each health officer who traced the source of contagium in his jurisdiction to some other jurisdiction in this State, or to some place outside of Michigan.

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*Third locality probably infected from second, shown in Table 8.

TABLE 8.—*First, second and third localities, where the second locality was infected with Scarlet Fever from the first, and the third was infected from the second; and the numbers of cases and deaths from Scarlet Fever in the first, second and third localities, with the dates of the beginning and ending of each outbreak.* (*Compiled from reports of health officers who were able to trace the source of contagium to other localities.*)

Number.†	First Localities from which Scarlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
1	Alpena county: Alpena city (Apr. 15 —.)	18	1	Bay county: Bay City (June-Feb. 19, 1896.)	13	0			
				Montmorency county: Hillman township (July-Dec.)	20	0			
2	Barry county	---	----	Calhoun county: Pennfield township (June 23-July 20.)	1	0			
3	Berrien county: Lincoln township	*	----	Berrien county: Lake township (Dec. 15-Dec. 25.)	1	0			
4	Berrien county: Pipestone township	*	----	Berrien county: Hagar township (Nov. 5-Dec. 15.)	3	0			
5	Calhoun county: Battle Creek city (Jan.-Dec.)	46	0	Calhoun county: Emmet township (Nov. 20 —.)	1	0			
6	Cass county: Dowagiac city	*	----	Van Buren county: Keeler township	1	0			
7	Cass county: Marcellus village (Oct.-Mar. 10, 1896.)	18	0	Cass county: Marcellus township (Oct. 25-Nov 27.)	9	0			
				St. Joseph county: Three Rivers city (Nov. 2-Nov. 15.)	3	0			
8	Cass county: Ontwa township	*	----	Cass county: La Grange township (Dec. 2-Dec. 24.)	1	0			
9	Chippewa county: Detour township (Jan.-June.)	72	12	Chippewa county: Drummond township (June 2-June 29.)	8	0			
				Pickford township (Jan.-August.)	67	8	Chippewa county: Rudyard township (July 24-Aug. 20.)	7	1
10	Genesee county: Clayton township (Jan. 1-Feb. 15.)	30	0	Genesee county: Flint township (Apr. 16-June 1.)	8	0			
11	Genesee county: Flint city (Jan. 1-Feb., 1896.)	58	0	Genesee county: Davison township (Jan. 1 —.)	100	0			
				Flushing village (Jan. 20-Feb. 20.)	1	0			
				Kent county: Sparta village (Oct.-Dec.)	4	0			
				Livingston county: Genoa township (May 20-June 7.)	1	0			

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* Scarlet Fever was not reported to this office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

† The consecutive numbers in this column refer to similar consecutive numbers before quotations in the text preceding this table.

TABLE 8.—CONTINUED.—*Movement of Infection.*

Number.†	First Localities from which Scarlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
12	Genesee county: Flushing township (Jan.-June 20.)	28	0	Shiawassee county: Hazleton township (Jan. 3-Jan. 13.)	1	0			
13	Genesee county: Montrose township	*	----	Shiawassee county: New Haven township (Nov. 24-Dec. 10.)	15	0	Shiawassee county: Hazleton township (Nov.-Dec. 5.)	3	0
14	Genesee county: Mt. Morris township (Jan. 6-Feb. 10.)	1	0	Genesee county: Flint township (Mar. 20-Mar. 31.)	1	1			
15	Genesee county: Richfield township (Jan.-Apr.)	8	0	Genesee county: Davison township (Jan. 13 —.)	1	0			
				Oakland county: Orion township (June 17-July 10.)	1	0			
16	Gratiot county: Arcada township (Jan. —)	1	0	Gratiot county: Alma village (Aug. 22-Sept. 10.)	1	0			
				Ithaca village (July 3-Aug. 8.)	1	0			
17	Gratiot county: North Star township	*	----	Gratiot county: Ithaca township (Feb. 4-Feb. 26.)	2	0			
18	Hillsdale county: Allen township (Jan.-Mar.)	7	0	Hillsdale county: Hillsdale township (Jan. 3-Jan. 20.)	9	0			
19	Houghton county: Calumet township (Jan. 1-Jan. 30, '96.)	79	2	Houghton county: Osceola township (Feb. 1-Aug. 10.)	3	0			
				Keweenaw county: Sherman township (Feb. 21-Mar. 1.)	1	0			
20	Huron county: Bloomfield township (Dec. 4 Dec. 31.)	8	1	Huron county: Sigel township (Dec. 18-Jan. 10, '96.)	4	0			
21	Ingham county: Lansing city (Jan. 25 —.)	1	0	Eaton county: Windsor township (Feb. 26-Dec. 1.)	13	0			
22	Ingham county: Locke township	*	----	Shiawassee county: Perry township (Mar. 16-Apr. 18.)	5	0			
23	Ionia county: Lake Odessa village	*	----	Ionia county: Campbell township (May 10-May 30.)	6	0			
24	Ionia county: Muir village	*	----	Ionia county: Ionia township (Aug. 15-Nov. —.)	7	0			
25	Ionia county: Odessa township	4	0	Ionia county: Campbell township (Jan. 1-Jan. 15.)	2	0			
26	Ionia county: Otisco township (Apr. 15-July 29.)	11	0	Ionia county: Belding city (May 29-Sept., 1896.)	102	1	Ionia county: Otisco township (Dec. 18-Mar. 20, '96.)	2	0
27	Jackson county: Columbia township	6	0	Jackson county: Napoleon township (Mar. 1-Mar. 20.)	1	0			

* † These foot-notes are on the bottom of the first page of this table.

TABLE 8.—CONTINUED.—*Movement of Infection.*

Number.†	First Localities from which Scarlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
28	Kalamazoo county: Kalamazoo city (Jan. 5-Jan. 4, 1896.)	103	2	Kalamazoo county: Kalamazoo township (Jan. 10-Apr. 3.)	8	0			
29	Kalkaska county: Rapid River twp.	*	----	Delta county: Masonville township (Aug. 3-Oct. 30.)	3	1			
30	Kent county: Cannon township (Mar. 1-Aug.)	14	0	Kent county: Grattan township (Sept. 17-Jan., 1896)	4	0			
31	Kent county: Cedar Springs village. (Jan. 12-Mar. 20.)	10	0	Kent county: Solon township (Mar. 12-May. —)	18	0			
32	Kent county: Grand Rapids city (Jan. 1-Dec. 31.)	185	6	Kalamazoo county: Kalamazoo township (July 7-Sept. 10.)	4	0			
				Newaygo county: Fremont village (July 1-July 16.)	1	0			
				Ottawa county: Holland township (Aug. 3-Aug. 17.)	1	0			
33	Lake county: Chase township	*	----	Newaygo county: Barton township (Jan. 6-Mar. 6.)	23	4	Osceola county: Rose Lake township (May 4-May 27.)	1	0
34	Lake county: Glencoe township (Feb. 15 —.)	1	0	Lake county: Luther village (Feb.-Mar. 7.)	4	0			
35	Lenawee county: Blissfield village (Jan.-Jan. 31)	2	0	Lenawee county: Ogden township (Jan. 29 —.)	17	2			
36	Lenawee county: Clayton village (Aug.-Oct. 20.)	63	1	Lenawee county: Dover township (Sept. 4-Apr., 1896.)	15	0			
				Franklin township (Sept. 3-Sept. 14.)	1	0			
				Rome township (Aug. 23 —.)	9	0	Lenawee county: Rollin township (Sept. 1-Sept. 7.)	1	0
37	Lenawee county: Hudson city	1	0	Hillsdale county: Hillsdale city (Apr. 10-Apr. 20.)	16	0			
38	Lenawee county: Riga township	2	0	Monroe county: Whiteford township. (Feb. 11-Mar. 12.)	8	0			
39	Livingston county: Hartland township	*	----	Shiawassee county: Vernon township (Feb. 4-Mar. 3.)	3	0			
40	Livingston county: Iosco township (— Dec. 1.)	2	0	Livingston county: Handy township (July 22-July 30.)	1	0			
41	Macomb county: Mt. Clemens city (Jan.-May.)	11	0	Wayne county: Hamtramck twp. (May 3-June 20.)	3	0			
42	Macomb county	----	---	Oakland county: Oakland township (Dec. 10-Dec. 25.)	4	0			
43	Manistee county: Manistee city	3	0	Osceola county: Le Roy township	14	0			

* † These foot-notes are on the bottom of the first page of this table.

TABLE 8.—CONTINUED.—*Movement of Infection.*

Number.†	First Localities from which Scarlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
44	Mecosta county: Big Rapids city (June 6-July 29.)	18	0	Mecosta county: Wheatland township (Dec. 18-Jan. 5, '96.)	2	0			
45	Monroe county: Dundee township (Oct.-Nov. 26.)	1	0	Monroe county: Milan township (Oct. —.)	1	0			
46	Montcalm county: Greenville city (Mar. 2 —.)	2	0	Ionia county: Ionia city (Apr. 22-June 13.)	3	0			
47	Montcalm county: Stanton city (— Dec.)	53	1	Montcalm county: Evergreen township. (Aug.-Sept.)	4	0			
48	Montcalm county	----	----	Kent county: Nelson township (Oct. 5-Oct. 24.) Mecosta county: Deerfield township (Feb. 8-Apr. 15.)	1 2	0 0			
49	Montmorency county: Hillman village	*	----	Montmorency county. Rust township (Nov. 20-Dec. 26.)	20	0			
50	Muskegon county: Fruitport	*	----	Mason county: Free Soil township (Jan. 2-Jan. 18.)	1	0			
51	Muskegon county: Muskegon city (Jan. 1-Dec. 21.)	56	4	Muskegon county: Muskegon H'ghts vil. (Mar. 29-Apr. 28.) Muskegon H'ghts vil. (Nov. 1-Dec. 30.)	6 8	0 0			
52	Oakland county: Milford village	1	1	Shiawassee county: Durand village (Sept. 18-Feb. 1,'96.)	12	1	Shiawassee county: Vernon township (Sept. 24-Jan. 15, '96.)	3	0
53	Saginaw county: Maple Grove twp. (Jan.-Jan.)	2	0	Shiawassee county: Hazleton township (Feb. 17-Mar. 1.)	1	0			
54	Sanilac county: Marlette village (Nov. 25-Dec. 2.)	1	1	Tuscola county: Koylton township (Dec. 1-Dec. 12.)	4	2			
55	Shiawassee county: Vernon village (Mar.-May 24.)	6	1	Shiawassee county: Venice township (May 1-June 10.) Vernon township (May 24-July 15.)	1 2	0 0			
56	St. Clair county: Marine city (Jan. 12-July —.)	62	9	St. Clair county: Algonac village (July 21 —.) Cottrellville township (Jan. 14-Feb. 6.) Cottrellville township (Oct.-Nov.)	1 8 1	0 0 1			
57	St. Clair county: St Clair township (Jan. 20-May —.)	14	1	St. Clair county: Columbus township (Apr. 9-May 20.)	4	0			
58	St. Joseph county: Constantine township	*	----	St. Joseph county: Mottville township (Aug. 12-Aug 20.)	6	0			

* †These foot-notes are on the bottom of the first page of this table.

TABLE 8.—CONTINUED.—*Movement of Infection.*

Number.†	First Localities from which Scarlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
59	Van Buren county: Geneva township	*	----	Van Buren county: South Haven village (Oct. 8-Mar. 13,'96.)	66	2			
60	Van Buren county: Hartford village (— Sept. 5.)	6	0	Van Buren county: Keeler township (June 6-Mar. 4.)	2	0			
61	Washtenaw county: Ann Arbor township	*	----	Washtenaw county: Northfield township (Apr. 6-Apr. 20.)	1	0			
62	Washtenaw county: Ypsilanti city (Jan. 10-Feb. 2.)	2	0	Lenawee county: Macon township (Mar. 1-Mar. 25.)	1	0			
63	Wayne county: Detroit city (Jan. 1-Dec. 31.)	319	13	Oakland county: Birmingham village (Apr.-Aug. 14.)	18	0			
				Wayne county: Greenfield township (Nov. 12-Dec. 14.)	3	1			
64	Wayne county: Plymouth village (Apr.-May 25.)	1	0	Wayne county: Canton township (Apr.-May.)	2	0			
65	Wexford county: Liberty township	*	----	Wexford county: Cedar Creek twp. (Sept. 15-Nov. 15.)	5	0			
66	Western part of State.	---	---	Calhoun county: Homer village (Jan. 4-Jan. 26.)	1	0			
	(*Movement of infection* **Into Michigan** *from outside the State.*)								
67	Canada	----	----	Lapeer county: Almont township (Mar. 11-May 5.)	2	0			
68	Chicago	----	----	Van Buren county: South Haven village. (Oct. 7-Oct. 12.)	1	0			
69	Dakota	----	----	Ionia county: Boston township (Jan.-May 20.)	3	0			
70	Massachusetts: Boston	---	----	Jackson county: Rives township (Apr. 11-Apr. 20.)	2	1			
71	Nebraska	----	----	Gratiot county: Newark township (Sept. 15-Nov. —.)	17	0			
72	New York	----	----	Schoolcraft county: Manistique village (July 2-July 25.)	2	0			
				Marquette county: Ishpeming city (Mar. 6 —.)	1	0			
73	Ohio: Bairdstown	----	----	Leelanaw county: Solon township (Mar. 10-Mar. 20.)	1	0			
74	Ohio	----	----	Lenawee county: Palmyra township (Mar. 10-Apr. 4.)	3	0			
75	Wisconsin: Ellis	----	----	Dickinson county: Iron Mountain city (Mar. 16 —.)	5	0			

* † These foot-notes are on the bottom of the first page of this table.

TABLE 8.—Continued.—**Probable** *Movement of Infection.*

Number.†	First Localities from which Scarlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
76	Barry county: Nashville village (Aug. 10-Nov. 29.)	25	0	Barry county: Castleton township (Sept. 27-Nov. 14.)	15	0			
77	Berrien county: Benton Harbor city	11	0	Berrien county: Watervliet township (Jan. 9-Feb. 25.)	3	1			
78	Berrien county: Weesaw township	9	0	Berrien county: Lake township	11	0			
79	Branch county: Bronson village (Dec. 2-Jan., 1896.)	5	0	Branch county: Mattison township (Dec. 26-Jan. 14,'96.)	1	0			
80	Clinton county: Watertown township	*	....	Eaton county: Oneida township (Nov. 7-Dec. 15.)	5	1			
81	Genesee county: Davison village (Jan. 1-Feb. 20.)	100	0	Sanilac county: Marlette village (May 11-May 21.)	1	0			
82	Genesee county: Flint township	1	1	Genesee county: Clayton township	30	0			
83	Houghton county: Calumet township (Jan. 1,'95-Jan. 30,'96.)	79	2	Keweenaw county: Allouez township (Sept. 23-Oct. 20.)	1	0			
84	Ingham county: Lansing city Jan. 25-Dec. 18.)	4	0	Ingham county: Delhi township (Apr. 7— 20.)	1	0			
				Jackson county: Jackson city (Oct. 20-Dec 21.)	10	0			
85	Ingham county: Onondaga	*	....	Jackson county: Jackson city (Sept. 2-Nov. 14.)	2	0			
86	Iron county: Iron River township	*	....	Iron county: Bates township (Nov. 1-Dec. 8.)	20	1			
87	Jackson county: Jackson city (Jan. 3-Dec. 21.)	24	0	Jackson county: Leoni township (Nov. 8-Dec. 6.)	1	0			
88	Jackson county	....	....	Hillsdale county: Somerset township (Feb. 1-Feb. 25.)	4	0			
89	Kalamazoo county: Texas township (May 8-Jan. 6, 1896.)	16	1	Kalamazoo county: Portage township (— July 13.)	6	0			
90	Kent county: Rockford village	*	....	Kent county: Cedar Springs village (Jan. 12-Mar. 20.)	10	0			
91	Kent county: Sand Lake village	*	....	Kent county: Nelson township (Jan. —.)	1	0			
				Montcalm county: Maple Valley twp. (July 15-July 29.)	6	0			
92	Lenawee county: Ogden township (Jan. 29 —.)	17	2	Lenawee county: Fairfield township (July 10-Sept. 14.)	3	0			
93	Lenawee county: Rome township (Jan. —.)	36	0	Lenawee county: Cambridge township (Jan.-Sept. 20.)	9	0	Lenawee county. Hudson township (Dec.-Jan. 11,'96.)	2	0
				Clayton village (Aug.-Oct. 20.)	63	1			

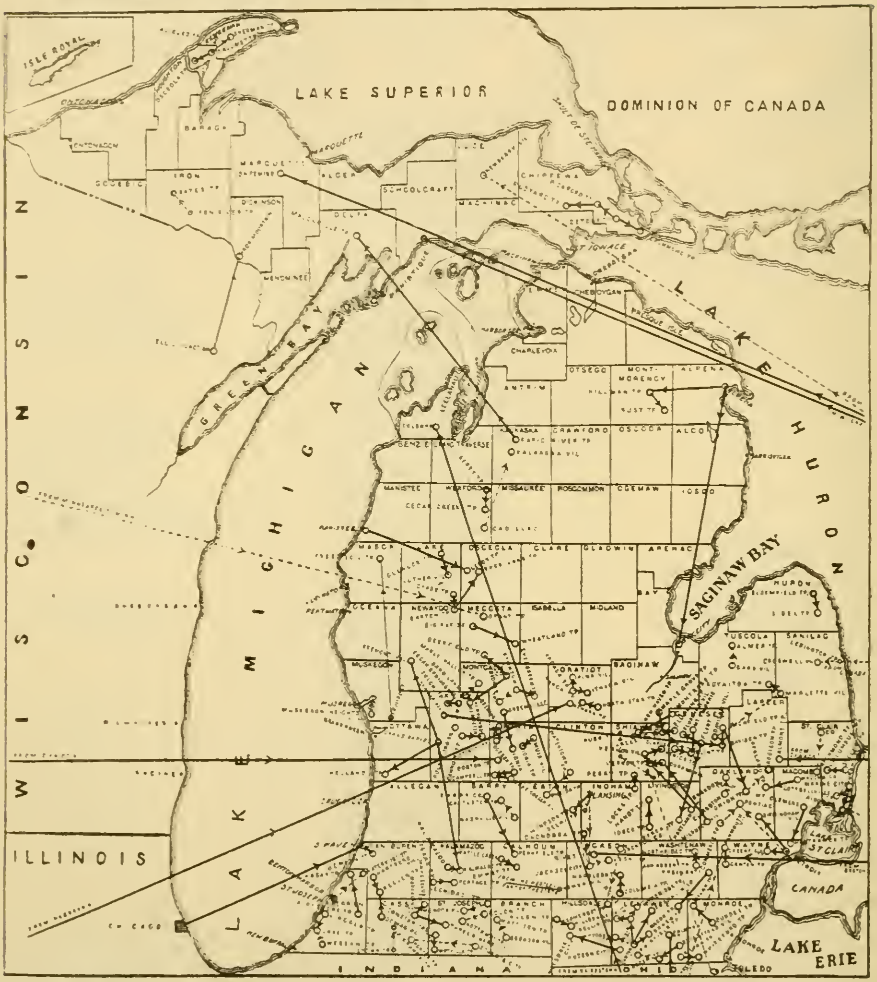
* † These foot-notes are on the bottom of the first page of this Table.

TABLE 8.—CONCLUDED.—**Probable** *Movement of Infection.*

Number.†	First Localities from which Scarlet Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
94	Montcalm county: Stanton city (— Dec. —.)	53	1	Montcalm county: Sidney township (Nov. 12-Nov. 25.)	1	0			
95	Oakland county: Clarkston village	*	----	Oakland county: Brandon township (Mar. 6-Apr. 6.)	2	0			
96	Oakland county: Commerce township (May 2-June 15.)	3	0	Oakland county: Pontiac city (June 10-Oct. 4.)	2	0			
97	Oakland county: Orion township	1	0	Oakland county: Addison township (Jan. 20-Feb. 13.)	1	0			
98	Shiawassee county: Owosso city (Jan. 10-Oct. 4.)	31	0	Shiawassee county: Byron village (June 2-June 12.)	3	0			
				Rush township (Feb. 1-Feb. 17.)	1	1			
99	St. Clair county	----	----	Macomb county: Richmond township (Mar. 14-Apr. 20.)	3	0			
100	St. Clair county: Marine City (Jan. 12-July —.)	62	9	St. Clair county: Algonac village (Oct. 20-Nov. 19.)	3	0			
101	St. Joseph county: Colon township (Mar. 1-July 15.)	9	1	St. Joseph county: Nottaway township (July 15-Sept. 15.)	12	0			
102	St. Joseph county: Leonidas township	5	0	St. Joseph county: Mendon village (Mar. 10-Mar. 20.)	1	0			
103	St. Joseph county: Sturgis city (May 8-June 12.)	6	0	Cass county: Porter township (July 10-Aug. 15.)	3	0			
104	Tuscola county: Caro village (Nov. —.)	1	0	Tuscola county: Almer township (Nov. 28-Dec. 13.)	1	0			
105	Wayne county: Detroit city (Jan. 1-Dec. 31.)	319	13	Oakland county: Pontiac city (May 6-June 4.)	1	0			
106	Wexford county: Cadillac city (Jan. 4-Jan. 10.)	1	0	Kalkaska county: Kalkaska village (June 1-June 10.)	1	0			
	(**Probable** *Movement of Infection* **Into Michigan** *from outside the State.*)								
107	Canada	----	----	Sanilac county: Lexington township (Apr. 20-June 18.)	3	0	Sanilac county: Crosswell village (Apr.-June 8.)	5	1
108	Minnesota: Minneapolis	----	----	Mecosta county: Grant township (Mar.-Apr. 2.)	3	1			
109	New York	----	----	Luce county: Newberry village (Mar. 10-Mar. 20.)	2	0			
110	Ohio: Toledo	----	----	Shiawassee county: Vernon village (Mar.-May 29.)	6	1			
111	Ohio	----	----	Wayne county: Plymouth village (Apr. 25-May 25.)	1	0			

* † These foot-notes are on the bottom of the first page of this table.

MOVEMENTS OF CONTAGIUM OF SCARLET FEVER IN 1895.



THIS MAP ILLUSTRATES TABLE 8. LINES CONNECT THE LOCALITIES INFECTED. THE ARROWHEADS INDICATE THE DIRECTIONS OF THE MOVEMENTS. ———→ DEFINITELY TRACED. - - - - → PROBABLY TRACED

[PLATE [illegible]]

NEGLECT OF MEASURES TO RESTRICT SCARLET FEVER, VIOLATION OF PUBLIC HEALTH LAWS, ETC.

Outbreak of Scarlet Fever in Stanton city, Montcalm County.

An outbreak of scarlet fever in Stanton city, was first reported by the health officer, Dr. A. L. Corey, in a final report sent to this office, July 30, 1895. No date given for the first of the six cases reported, isolation was enforced, all the houses were disinfected, but not all the rooms, and clothing, bedding, etc., were disinfected. On Sept. 19, a final report of eight cases was received from Dr. Corey. In this he reported only two patients isolated, that the houses were disinfected, but he did not state how much sulphur was burned, and in regard to the disinfection of clothing, bedding, etc., that he could not tell of his own knowledge as he was not there. Dr. Corey reported 35 cases and 1 death in a report, dated Nov. 22, 1895. Only two of these cases were isolated. In a letter attached to this report he stated that while he was ill and unable to attend to business, a boy who had scarlet fever was allowed to attend school while "scaling" and he attributed 28 cases to this source. The first one in the school reported to have taken the disease from this boy was his seat-mate. Dr. Corey ordered, that no pupils who had the disease should be allowed to return to school without an order from him; which order was strictly carried out. He reported four cases in December, traced to previous cases of the disease, only one case isolated, and but 10 pounds of sulphur burned in four households; and, that the clothing, bedding, etc., were supposed to have been disinfected by burning sulphur and by boiling. There were 53 cases and 1 death reported to have occurred in this outbreak.

Outbreak of Scarlet Fever in Clayton Village, Lenawee County.

In Clayton village, Lenawee county, 63 cases of scarlet fever and one death from this disease were reported to have occurred from Aug. to Oct. 20, 1895. Dr. E. J. C. Ellis, health officer of the village, in a letter, dated Aug. 24, wrote that the mother of the first family in which the disease occurred, thought that they had been exposed by visiting a family in Rome Tp., where they had scarlatina the winter before, and that she did not know whether the house had been disinfected or not. (A neglected outbreak of 38 cases, from Aug. 24, 1894, to Mar., 1895, was reported in Rome Tp.)

Dr. Ellis wrote, Sept. 1, that there had been about 30 cases up to that time, and asked for printed circulars on the prevention and restriction of scarlatina to be sent to him. No further report of this outbreak was received at this Office until, in response to a request for a final report of the same, Dr. Ellis wrote, Nov. 8, that he had been sick and unable to attend to business for two months, and suggested that the new health officer, D. W. La Furgey, be asked for the final report. Undoubtedly, the spread of this disease was due to the fact that Dr. Ellis was unable to attend to his duties as health officer at that time. Health Officer La Furgey sent in a final report, dated Nov. 16, 1895, in which he stated, that from the time of his appointment as health officer all cases were isolated from all except the nurse and physician, all restrictive measures were carried out, and he burned about 350 pounds of sulphur, which was from 20 to 35 pounds in each house according to size. He reported 42 cases and 1 death in 14 households, that the body was wrapped in a cloth wet with zinc solution and buried immediately, and, upon his appointment to the office, he issued notice that all children under twelve years of age should be kept at home for fourteen days, after which there were no more cases.

Outbreaks in Rome, Dover, and Franklin townships were reported traced to this outbreak, and one in Hudson township was reported as probably from some house in Clayton village.

Outbreak of Scarlet Fever in Belding City, Ionia County.

An outbreak of scarlet fever in Belding, Ionia county, was reported by the health officer, Dr. I. S. Morris, to have commenced in May, 1895, and that the contagium was brought from Otisco Tp. He also reported that some cases having scarlatina were not reported to him, and that many thought scarlatina a distinct disease from scarlet fever, and hence he feared the spread of the disease. The outbreak continued until Sept. 12, 1895, resulting in 102 cases and 1 death. Dr. Morris wrote, Nov. 16, that he thought the reason why so many school children were coming down with the disease was that a little girl had it and was not reported, going to school while desquamating. In a final report, sent in May, 1896, Dr. Morris reported that he disinfected all the houses in which there were cases of the disease, but not all the rooms, at the rate of three pounds of sulphur per one thousand cubic feet of air space, placarded the houses, and isolated as far as possible in the reported cases. In regard to restrictive measures used in the last 15 cases in this outbreak, he used only two pounds of sulphur per one thousand cubic feet of air space, and stated that some were careless during convalescence.

Outbreak oj Scarlet Fever in Pickford Township, Chippewa County.

An outbreak of scarlet fever in Pickford township, Chippewa county was reported by the health officer, Dr. D. H. Webster, to have commenced in December, 1894; and, so far as he could learn, the source of contagium was from Detour. Owing to the houses being small he had no means of isolating. The outbreak continued until in August, 1895, resulting in 68 cases and 8 deaths, about 50 of which, the clerk of the township stated, were not reported. Dr. Webster reported relative to 22 cases. He traced the source of contagium of nine cases, which occurred in July and August, to households where they had the disease and did not report it to the health officer and had no disinfection. He also reported no isolation in these nine cases, because of the smallness of the dwellings. An outbreak of 7 cases and 1 death, from July 24, to August 20, 1895, in Rudyard Tp. was reported traced to Pickford Tp.

Difference of Diagnosis. Alleged Outbreak of Scarlet Fever in Colon Township, St. Joseph County.

A difference of diagnosis in alleged cases of scarlet fever in Colon township caused the supervisor of the township to ask the State Board of Health to send an expert to investigate and determine the nature of the disease. Dr. Geo. H. Cattermole, employee of this Board, was sent to Colon township for that purpose, and on his return reported to the Secretary of this Board, that, the difference of opinion of physicians was as to whether the disease by which the patients had been attacked was scarlet fever or measles, and, after giving a history of the cases up to the date of his arrival in Colon, as related by the attending physicians, Dr. Cattermole continued:—

"I went into the Bright house alone, Dr. Sides remaining in the yard. I found that of the five children all had been sick except the eldest, a girl about 14 years old, who said that she had, what the doctor called scarlet rash, two years before. Of the four children who had been sick, all were desquamating except the baby (about one year old), who was taken sick Thursday, March 28.

"There was no rash on any of the children when I saw them. The tonsils were enlarged, fauces inflamed, and cervical glands enlarged in all of the four cases. All of the cases looked anæmic, and one child showed œdema about the eyes.

"After hearing the statements of all parties mentioned above, I told Drs. Sides and Hartman that the desquamation was more extensive than usually found in measles; that the glands at the angle of the jaw were not so commonly found enlarged in cases of measles as in cases of scarlet fever.

"I said to Mr. Teller, and to the clerk of the township, that as the history of the cases was very contradictory, and as the last case had been sick for at least one week, the symptoms at present were not sufficiently clear to make a positive diagnosis, and a diagnosis *then* was unnecessary, as the cases should be cared for, until their recovery, in the same manner, whether the disease was measles or scarlet fever.

"I recommended to the local health board, that they continue the isolation of the members of the Bright family, including the father; that the township should provide the family with necessaries during isolation; that the premises and clothing should be thoroughly disinfected before releasing the family from quarantine.

"The members of the board of health agreed to act in accordance with the requirements of the health laws, and at once ordered the father to remain at home until released by the health officer, the board being willing to supply them with provisions.

"The three health officials expressed themselves as being satisfied with the investigation, so I left Colon at five o'clock Thursday evening, April 4, 1895."

There were nine cases and 1 death reported in this outbreak. Dr. E. L. Godfrey reported that four of these cases, the last of which recovered July 15, 1895, were isolated from all except the parents and physicians, and that all the rooms, bedding, clothing, etc., were disinfected by fumes of burning sulphur, but he did not state the quantity per 1,000 feet of space. The burial was strictly private, conducted by the undertaker and the health officer.

Neglect of Mild Cases of Scarlet Fever.

The large numbers of cases of scarlet fever in the following outbreaks are attributed by the health officers of the various localities to neglect in reporting and restricting mild cases of this disease. These outbreaks are only a few instances of the many so reported to this office.

Outbreak of Scarlet Fever in Elbridge Township, Oceana County.

A final report of an outbreak of scarlet fever in Elbridge township, Oceana county, was received at this office, Jan. 12, 1895, from F. H. Sowers, health officer of that township. He reported five cases in one household from Nov. 25, 1894, to Jan. 1, 1895. In an outbreak report he stated that the first case was not reported to him until ten days after being taken sick, that he then quarantined the family, but he left the disinfection to be done by the family, and " probably it was not done as well at it should have been." No more cases were reported until Feb. 14, when there were nine reported, the first of which was traced to the December cases. He also stated that it was thought that there were mild cases not reported that caused the spread of the disease, that some were sick in school, the whole district affected, and asked if it would be necessary to disinfect the school house.

Secretary Baker replied to this question, Feb. 18, as follows:—

"You should certainly close the school and thoroughly fumigate the school house with burning sulphur, following the rules as recommended by this Board in a pamphlet on the restriction and prevention of scarlet fever, a marked copy of which I enclose herewith.

"Relative to the danger of the disease spreading, it can only be prevented by the thorough isolation of all those exposed until all danger of communicating the disease is past, and the thorough disinfection of all rooms, clothing, etc., after complete recovery of those sick."

In a later report, health officer Sowers reported that the school had been closed, also the church and town hall, houses quarantined, patients were isolated as much as possible, and probably about 100 pounds of sulphur were burned. This neglect to report mild cases of the disease resulted in 21 cases and 3 deaths.

Outbreak of Scarlet Fever in Clayton Township, Genesee County.

In regard to restrictive measures used in an outbreak of scarlet fever in Clayton township, Genesee county, in Jan., 1895, the health officer, Dr. A. B. Clark, reported that only in the first family was isolation complete, for the rest kept the matter quiet until over the disease or nearly so, and, that many cases were never reported and mingled with every one, exposing the whole neighborhood. He reported, "The final stoppage by prompt means when folks became alarmed and reported to headquarters as they should."

Scarlet Fever in Marine City, St. Clair County.

An epidemic of 80 cases of scarlet fever was reported to have commenced in Marine City in Sept., 1894, and was supposed by Dr. C. W. Shaver, the health officer of the city, to have ended Jan. 2, 1895, and was so reported. (This epidemic was briefly mentioned in the Annual Report of this Board for 1895 on page 258.) Two weeks later new cases occurred and the epidemic continued throughout the year and until the first of July, 1896, resulting in 62 cases and 9 deaths in addition to the 80 cases of the preceding year.

The great prevalence of this disease was reported by Dr. Shaver to have been caused by mild cases which were not reported and were unrestricted. In Dec., 1895, complaint was received at this office, that patients were not isolated, that restrictive measures were not being taken in quarantining infected persons and households, and that the schools were to be closed in consequence of this neglect. Dr. Blagborne, health officer of Marine City at this time, confirmed this report in a letter in which he wrote, that in a family in which a death from scarlet fever was reported there had been mild cases not reported, members of this family attending the different schools of the city. Dr. Blagborne further wrote that he had caused printed circulars, on the law requiring householders and physicians to report communicable diseases, to be distributed throughout the city, one for each house; and asked the Secretary of this Board for information relative to conducting funerals in cases of contagious diseases, etc.

Secretary Baker replied, Jan. 2, 1896, as follows:—

"Relative to the holding of funerals, there is no law requiring funerals to be held in the night, neither is there any law requiring a private funeral, but Act 137, laws of 1883, requires the health officer to supervise funerals of persons dead from dangerous communicable diseases, and the State Board of Health recommends that all burials of the dead from scarlet fever should be private and the body should not be exposed to view.

"I am informed that you have ordered the schools closed for thirty days. The closing of schools is such a confession of inability of the local health authorities to properly cope with a dangerous disease, that this office does not recommend that. It is much better for the quarantine to be applied to the sick and infected persons than to the whole people of a city or village. The law does not contemplate doing that, and I question whether you or your board could enforce it if your authority is denied. The law provides that *every infected person and thing shall be isolated.* If that is done there is no need of quarantining all the people of a city or village.

"If any school house is infected it should be thoroughly disinfected before allowing children to attend school, and the school should be closed for that purpose but opened again as soon as the building has been thoroughly disinfected. There may be extraordinary conditions which make it important to close a school; but it should not ordinarily be done."

The question as to the advisability of closing schools during an outbreak of a dangerous communicable disease has been frequently asked.

In addition to the opinion stated in above letter, Secretary Baker has replied, that he did not think that a health board had the authority to order the closing of schools, except for the purpose of disinfection, unless the board had first made and published regulations telling just what it intended to do, and that while every local board of health has, undoubtedly, the right to make and publish regulations, it must be done legally and the regulations must state just what is intended to be done, and they must be published.

Outbreak of Scarlet Fever in Davison Township, Genesee County.

Dr. E. D. Gardner, health officer of Davison township, Genesee county, reported an outbreak of 100 cases of scarlet fever in his jurisdiction from Jan. 1, to Feb. 20, 1895. He reported the source of contagium to have been from Flint, that the exceptions to complete accomplishment of restrictive measures were many, as the epidemic was light and no one would report cases when no physician was called, and that all cases were traced to a former case.

Outbreak of Scarlet Fever in South Haven Village, Van Buren County.

In October, 1895, an outbreak of scarlet fever was reported in South Haven village, by the health officer, Dr. M. E. Bishop. This outbreak, in which there were 66 cases and 2 deaths, continued until March, 1896. Relative to the spread of this disease, Dr. Bishop wrote:—

"In the beginning of the outbreak only one case was reported to me, but I found the disease in two other houses near by. From that on the disease spread from the school so that I placarded seven houses in one week, and there was talk of closing the school. All cases seemed to come from the first grade of the school. Finally the teacher of that grade contracted the disease, and that part of the school was closed for six weeks; and I thoroughly fumigated the school room. After that time there was considerable abatement of the disease. Along with the genuine scarlet fever there were a good many cases of Rötheln, when reported to me I made no difference in restiction. I am certain that some cases of scarlet fever were not reported. There was considerable sickness caused by scarlet fever. Most of the cases were of a mild type."

In regard to restrictive measures used, Dr. Bishop reported that only 10 of the 66 cases were isolated, so far as he could learn, that all the rooms, clothing, bedding, etc., were disinfected, the "burials were without funerals and according to the directions of the State Board of Health"; and, that efforts at restriction were very good where people obeyed orders. That before hearing from the Secretary of the State Board of Health as to liability of the township to pay for the disinfection, etc., householders concealed mild cases and many desired to do their own fumigating and in such manner as they pleased.

OUTBREAKS OF SCARLET FEVER IN WHICH ISOLATION AND DISINFECTION WERE ENFORCED.

The following is the substance of a few health officers' statements which are representive of the statements of those health officers whose reports indicated that they had quite carefully enforced isolation and disinfection:—

In regard to the method used in restricting an outbreak of scarlet fever in Coloma village, Berrien county, Dr. H. M. Marvin, the health officer, reported, substantially, as follows:—

Both patients were isolated from all except physicians and nurse by being placed in rooms having outside doors, the inner doors having been calked with rags which were afterwards burned. A mixture of eucalyptus, turpentine, and carbolic acid in water was placed on the stove. The discharges of the patients were disinfected by Platt's chloride and buried. After the patients recovered, all infected clothing, bedding, etc., were disinfected by fumes of burning sulphur; the woodwork of the patients' rooms were washed with a solution of Platt's chloride, and all the rooms were disinfected by fumes of burning sulphur at the rate of three and one-fourth pounds per 1,000 feet of air space.

Dr. A. H. Cameron, health officer of Watertown township, Tuscola county, reported a case of scarlet fever in a hotel, but the disease was limited to this case. In regard to restrictive measures he reported, in substance, as follows:—

Both patient and nurse were completely isolated in a room in an isolated part of the house, copperas and chloride of lime were used in disinfecting the privy vault also the discharges of the patient which were afterward buried. All infected clothing, bedding, etc., were disinfected by fumes of burning sulphur, as were the rooms - eight-en pounds of sulphur having been burned.

Dr. F. E. Andrews, health officer of Adrian, Lenawee county, sent in a final report of one case. This occurred in a family of six children, but was confined to one case. Relative to restrictive measures used in this instance he stated, substantially, as follows:—

The child was isolated from all except the nurse and physician, the discharges of patient were carbolized and buried, all infected clothing, bedding, etc , were disinfected by boiling and fumes of burning sulphur, and all the rooms were disinfected by fumes of burning sulphur—burning fifteen pounds.

Concerning an outbreak of scarlet fever in Norway City, Dickinson county, the health officer, J. B. Brasseur, reported, substantially, as follows:—

The disease was brought from outside by a traveling member of the family. Patient was isolated from all except the nurse and physician and the house promptly quarantined. Three pounds of chloride of lime were used in the privy vault and the discharges of patient were disinfected by lime chloride solution and buried. All infected bedding, clothing, etc., were disinfected by fumes of burning sulphur, and, after the patient recovered, all the rooms of the house were disinfected by fumes of burning sulphur at the rate of four pounds per 1,000 feet of air space.

Dr. Wilbur F. Hoyt, health officer of Paw Paw township, Van Buren county, reported in regard to three cases of scarlet fever in one family in his jurisdiction, in Feb., 1895, in substance, as follows:—

Supposed to be from an outbreak that occurred in the same region last August, where in one house the disinfection was not sufficient, these cases having been in that house a few days before they were taken sick. All the patients were isolated, notice posted on the door, the discharges of patients were disinfected by carbolic acid, all infected clothing, bedding, etc., disinfected by sulphur fumes and zinc solution. After the outbreak was over all the rooms were disinfected by fumes of burning sulphur at the rate of three pounds per 1,000 feet of space.

ESTIMATED NUMBER OF CASES OF SCARLET FEVER PREVENTED AND NUMBER OF LIVES SAVED BY ISOLATION AND DISINFECTION.

Tables 9 and 10 and the following diagram compare the average numbers of cases and deaths in outbreaks of scarlet fever where the measures of isolation and disinfection, prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases and deaths in those outbreaks where those measures were neglected.* By Table 10 it may be seen that during the nine years, 1887–95, there were over five times as many cases, and nearly five times as many deaths in those outbreaks in which these measures were neglected as in those outbreaks in which they were enforced.

By Table 9 it may be seen that during the year 1895 there were reported to the office of the State Board of Health 555 outbreaks of scarlet fever, with 2,905 cases and 85 deaths. Had no efforts at restriction been made, and had the average numbers of cases and deaths per outbreak remained the same as in the column headed "Isolation and Disinfection both Neglected," there would have occurred 7,703 cases and 183 deaths, and taking from these respectively the cases (2,905) and deaths (85) which did occur, leaves 4,798 cases and 98 deaths indicated as prevented in these 555 outbreaks, by isolation and disinfection. By the same method for each year the indicated saving in the 4,641 outbreaks which occurred during the nine years, 1887–95, is 29,522 cases and 986 lives. This is shown in Table 10.

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*Definition of the term, "Outbreak": An outbreak is considered as the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village, or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of 60 days or over has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak has been considered ended.

In the compilation of the reports for Tables 9 and 10 and the diagram showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the numbers of cases and deaths were placed in the column headed "Isolation and Disinfection both Neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed "Isolation and Disinfection Enforced." If, however, he neglects to properly isolate or disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed "Isolation or Disinfection or both not mentioned, or statements doubtful."

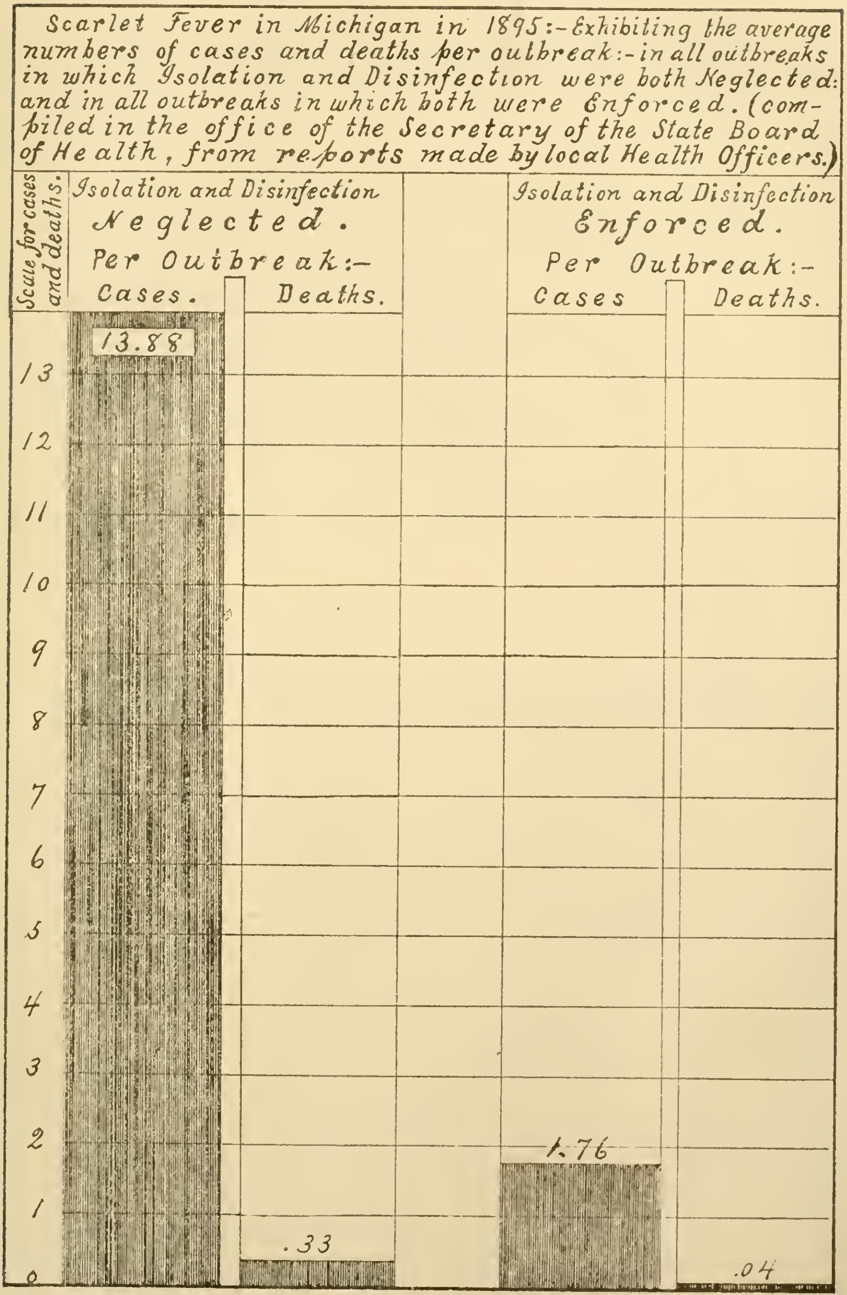
TABLE 9.—*Scarlet Fever in Michigan in 1895: Exhibiting the Average Numbers of Cases and Deaths per Outbreak:—(1) in all the 555 outbreaks reported; (2) in the 275 outbreaks in which it is doubtful whether or not Disinfection or Isolation was enforced; (3) in the 19 outbreaks in which Disinfection was enforced and Isolation doubtful; (4) in the 30 outbreaks in which Isolation was enforced and Disinfection was doubtful; (5) in the 24 outbreaks in which Disinfection was enforced and Isolation neglected; (6) in the 33 outbreaks in which Isolation was enforced and Disinfection neglected; (7) in the 82 outbreaks in which Isolation and Disinfection were both neglected; (8) in the 92 outbreaks in which Isolation and Disinfection were both enforced.*

	(1) All outbreaks. (555 outbreaks.*)		(2) Isolation or Disinfection or both not mentioned, or statements doubtful. (275 outbreaks.)		(3) Disinfection enforced—Isolation doubtful. (19 outbreaks.)		(4) Isolation enforced—Disinfection doubtful. (30 outbreaks.)		(5) Disinfection enforced—Isolation neglected. (24 outbreaks.)		(6) Isolation enforced—Disinfection neglected. (33 outbreaks.)		(7) Isolation and Disinfection both neglected. (82 outbreaks.)		(8) Isolation and Disinfection both enforced. (92 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals	2,905	85	1,259	42	64	3	93	5	116	3	73	1	1,138	27	162	4
Averages	5.23	.15	4.58	.15	3.37	.16	3.10	.17	4.83	.13	2.21	.03	† 13.88	† .33	† 1.76	† .04

*These do not include the cases and deaths in Detroit, Grand Rapids, Battle Creek, Flint, Kalamazoo, Muskegon, and Calumet Tp., because of the difficulty in determining the beginning and ending of an outbreak in these cities, or townships in which the disease was present in some part of the city or township nearly all the time. See foot-note to Table 10.

†These figures are graphically represented in the diagram opposite this page, entitled "Isolation and Disinfection restricted Scarlet Fever in Michigan in 1895."

ISOLATION AND DISINFECTION RESTRICT SCARLET FEVER.



Scarlet Fever in Michigan in 1895:-Exhibiting the average numbers of cases and deaths per outbreak:-in all outbreaks in which Isolation and Disinfection were both Neglected: and in all outbreaks in which both were Enforced. (compiled in the office of the Secretary of the State Board of Health, from reports made by local Health Officers.)

[PLATE 878]

This diagram graphically represents the lower line of figures in the last four columns of Table 9.

TABLE 10.—*Exhibiting for the nine years, and for each of the nine years 1887–95, the numbers of Reported Outbreaks, Cases and Deaths; also for this nine-year Period, the average numbers of Cases and Deaths per Outbreak in all outbreaks; in those Outbreaks in which Isolation or Disinfection or both were Doubtful; Isolation and Disinfection both Neglected; Isolation and Disinfection both Enforced; and, also, the Numbers of Cases and Deaths Indicated as having been prevented by Isolation and Disinfection.*

Years.	All Outbreaks.*			Isolation or Disinfection, or both, not Mentioned, or Statements Doubtful.			Isolation *and* Disinfection both Neglected.			Isolation and Disinfection both Enforced.			Cases and Deaths Indicated as having been Prevented by Isolation and Disinfection.	
	Out-breaks.	Cases.	Deaths.	Out-breaks.	Cases.	Deaths.	Out-breaks.	Cases.	Deaths.	Out-breaks.	Cases.	Deaths.	Cases.	Deaths.
18 7	299	1,882	141	190	1,200	93	32	440	34	64	148	11	† 2,220	† 177
1888	340	1,838	112	225	955	74	61	724	33	36	80	3	† 2,198	† 72
1889	417	2,822	123	284	1,453	61	72	1,208	48	52	140	10	† 4,175	† 156
1890	477	3,054	115	302	1,711	67	94	1,137	36	42	76	1	† 2,718	† 66
1891	602	4,936	193	380	3,012	91	141	1,704	66	42	107	1	† 2,342	† 90
1892	622	5,240	306	377	2,944	188	110	1,621	59	42	97	7	† 3,928	† 30
1893	667	5,219	327	387	3,197	204	124	1,511	99	60	157	8	† 2,912	† 207
1894	662	4,349	175	378	2,366	93	104	1,348	42	74	187	9	† 4,231	† 90
1895	555	2,905	85	275	1,259	42	82	1,138	27	92	162	4	† 4,798	† 98
Totals	4,641	32,245	1,577	2,798	18,097	913	820	10,831	444	504	1,154	54	{ ‡29,522 { 29,063	‡ 986 929
Averages, nine years	516	3,583	175	311	2,011	101	91	1,203	49	56	128	6	3,283	110
Average cases and deaths per outbreak for nine years, 1887–95	--------	6.95	.34	--------	6.47	.33	--------	13.21	.54	--------	2.29	.11	--------	--------

* Outbreaks in Detroit, Grand Rapids and a few other localities, where the disease was present throughout the whole year, are not included, owing to the difficulty in determining the beginning and ending of an outbreak in those localites. The localities which are thus excluded in 1895 are given in a foot-note to Table 9 of this article; and for previous years, in foot-notes to similar tables in articles on scarlet fever for those years.

† The numbers of cases and deaths in this double column are found by multiplying "all outbreaks" for each year by the average numbers of cases or deaths per outbreak, in those outbreaks in which isolation and disinfection were both neglected, for that year, and deducting from the results thus obtained, the cases or deaths, as the case may be, which were reported to have occurred that year. ‡ The two sets of numbers appearing in this column are based on two distinct methods of solution which are explained as follows:—(1) The 29,522 cases and 986 deaths are totals of the columns representing cases and deaths saved as explained in the † foot-note, (2) the 29,063 cases and 929 deaths are obtained by multiplying the average numbers of cases and deaths per outbreak for the nine years, 1887–95, (13.21 and .54, where isolation and disinfection were neglected) by the total number of outbreaks, to find the numbers which would have occurred if all outbreaks had been neglected, and subtracting therefrom the numbers of cases and deaths that were reported as having occurred during the nine-year period.

Period of Incubation, in Scarlet Fever.

TABLE 11.—*Exhibiting the reported Period of Incubation, stated in days, in 139 instances of Scarlet Fever. Compiled from reports of Health Officers in Michigan, for the yea-, 1895.*

Incubation period—Days	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	17	18	21	24	28	30	42
Instances in each period.	*1	2	†6	‡11	§11	¶4	‖27	**8	††3	‡‡21	6	§§5	1	¶¶16	4	1	1	7	1	1	***1	1

* In this instance it was reported as about 1 day.
† In 4 of these instances it was reported as about 3 days.
‡ In 1 of these instances it was reported as about 4 days.
§ In 3 of these instances it was reported as about 5 days.
¶ In 2 of these instances it was reported as about 6 days.
‖ In 11 of these instances it was reported as about 7 days.
** In 7 of these instances it was reported as about 8 days.
†† In 2 of these instances it was reported as about 9 days.
‡‡ In 9 of these instances it was reported as about 10 days.
§§ In 1 of these instances it was reported as about 12 days.
¶¶ In 5 of these instances it was reported as about 14 days.
‖‖ In 2 of these instances it was reported as about 21 days.
*** In this instance it was reported as about 30 days.

The average period of incubation in the 139 reported instances is 9.8 days; the greatest number of instances given in any single period was in the 7 day period.

TABLE 12.—*Exhibiting, relative to 63 instances of Scarlet Fever in Michigan in 1895, the Reported Period of Incubation, within certain limits, stated in days; also the Means, the Average of which may Represent the Average Period of Incubation.*

Days.	Means.	Days.	Means.	Days.	Means.	Days.	Means.	Days.	Means.
1 to 3	2	3 to 6	4.5	4 to 8	6	7 to 16	11.5	10 to 12	11
1 to 12	6.5	3 to 7	5	4 to 8	6	7 to 20	13.5	10 to 12	11
1 to 14	7.5	3 to 7	5	4 to 14	9	7 to 28	17.5	10 to 12	11
2 to 7	4.5	3 to 8	5.5	5 to 6	5.5	8 to 10	9	10 to 14	12
2 to 8	5	3 to 8	5.5	5 to 6	5.5	8 to 10	9	10 to 15	12.5
2 to 9	5.5	3 to 8	5.5	5 to 7	6	8 to 10	9	10 to 20	15
2 to 13	7.5	3 to 10	6.5	5 to 8	6.5	8 to 12	10	10 to 21	15.5
2 to 14	8	3 to 10	6.5	5 to 14	9.5	8 to 14	11	12 to 14	13
2 to 18	10	4 to 5	4.5	5 to 25	15	8 to 21	14.5	12 to 14	13
3 to 4	3.5	4 to 6	5	6 to 7	6.5	9 to 10	9.5	16 to 17	16.5
3 to 5	4	4 to 6	5	6 to 7	6.5	9 to 10	9.5	30 to 42	36
3 to 5	4	4 to 7	5.5	7 to 9	8	9 to 11	10	----------	----------
3 to 5	4	4 to 7	5.5	7 to 14	10.5	9 to 20	14.5	----------	----------

The average of all the means, for the 63 instances, is 8.8 days.

AGES OF GREATEST PREVALENCE OF, AND MORTALITY FROM, SCARLET FEVER.

Methods Employed in Compiling, Relative to Ages.

In compiling data relating to ages, used in tables in this article, when the ages are stated, as they usually are, in full years, the cases or deaths are compiled under the years mentioned. When the ages are stated in months, or years and months, the following method is pursued:—Persons under one year and six months old are classed as aged *one* year. Those over one year and six months and under two years and six months are classed as aged *two* years. Those over two years and six months and under three years and six months are classed as three years of age, and so on for each year.

In dividing the ages into five-year periods, the first period consists of all ages from birth to five years and six months. The second five-year period includes all ages over five years and six months and under ten years and six months. The third five-year period includes all ages over ten years and six months and under fifteen years and six months; and in each succeeding period the same arrangement is followed.

In Table 13 are shown the numbers of cases of, and deaths from scarlet fever in Michigan in 1895, in which the ages were stated in the health officers' reports. In this table the cases and deaths are arranged in *age-groups*, showing what per cent the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths; the per cent the deaths in each group were of the cases in that group, and the per cent the deaths in special groups were of all deaths.

TABLE 13.—*Exhibiting in certain Age-Groups, the numbers of Cases and Deaths from Scarlet Fever; the per cent that the Cases in each group were of All Cases; the per cent that the Deaths in each group were of All Deaths; and the per cent that the Deaths in each group were of the Cases in that group.—Compiled from all reports for the year 1895 which stated the ages.*

	Number and per cent of Cases and Deaths in certain Age-groups.†																		
Ages in groups of years.	All ages known.	0-1.	1-2.	2-3.	3-4.	4-5.	0-5.	5-10.	10-15.	15-20.	20-25.	25-30.	30-35.	35-40.	40-45.	45-50.	50-55.	55-60.	Over 60.
No. of cases	*2,359	120	139	198	219	188	864	902	346	124	49	30	24	12	1	4	1	1	1
Per cent the cases in each group were of all cases	100	5.1	5.9	8.4	9.3	8.0	36.6	38.2	14.7	5.3	2.1	1.3	1.0	.5	.04	.2	.04	.04	.04
No. of deaths	83	10	10	7	14	9	50	16	9	6	2	0	0	0	0	0	0	0	0
Per cent the deaths in each group were of cases in that group	3.5	8.3	7.2	3.5	6.4	4.8	5.8	1.8	2.6	4.8	4.1	0	0	0	0	0	0	0	0
Per cent the deaths in each group were of all deaths	100	12.0	12.0	8.4	16.9	10.8	60.2	19.3	10.9	7.2	2.4	0	0	0	0	0	0	0	0
Per cent the deaths in special groups were of all deaths	--------	60.2					79.5		20.5			0							

* Does not include those cases or deaths where the age was not stated.

† The method of grouping is stated in the text above.

Of the 3,908 cases of scarlet fever reported to this office for the year 1895, the ages were given in 2,359 instances, and of the 125 deaths reported for the same year, the ages of the decedents were given in 83 instances. As the number of deaths per hundred cases is nearly the same in the total numbers reported as in the smaller numbers where the ages were stated (being 3.2 for the total numbers and 3.5 for those where ages were given), evidently those cases and deaths where the ages were stated are fair averages.

By this table (13) it may be seen that the greatest number of cases of scarlet fever occurred in children under 10 years of age,—74.9 per cent of all cases having occurred in that period of age. 19.9 per cent of all cases occurred in the next two age-periods, 10 to 20 years.

The greatest number of deaths occurred in the first five-year period,—60.2 per cent of all deaths having occurred in that age-period. The next greatest number of deaths occurred in the second five-year period, 5 to 10 years,—19.3 per cent of all deaths having occurred in that age-period.

About ninety-five per cent of all the cases of scarlet fever, in which the ages were stated, occurred in persons under twenty years of age. This has also been the case in the years, 1892–94. Of the deaths, in which the ages were stated, 97.6 per cent occurred in persons under twenty years of age. In the years, 1892, 1893 and 1894, the proportions were about the same.

TABLE 14.—*Exhibiting in certain Age-Groups, the numbers of Cases and Deaths from Scarlet Fever in the four years and in each of the years 1892–95; the per cent that the Cases in each group were of All Cases; the per cent that the Deaths in each group were of all Deaths.—Compiled from all reports for the years 1892–95, which stated the ages.*

Year.		Total No. included. *	Per Cent of Cases and Deaths in certain Age-groups.										
			All Ages.	0 to 5.	5 to 10.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	Over 45 years.
1892.	Cases	2,832	100	30.0	41.1	18.4	5.9	2.1	.9	1.0	.4	.1	.1
	Deaths	128	100	48.4	35.9	10.9	1.6	.8	0	1.6	0	.8	0
1893.	Cases	2,666	100	38.7	36.6	15.0	5.1	2.0	1.1	.8	.4	.3	.1
	Deaths	166	100	56.0	27.1	12.0	1.8	1.8	.6	0	0	.6	0
1894.	Cases	2,595	100	36.4	38.5	15.0	5.4	1.8	1.6	.6	.4	.2	.2
	Deaths	91	100	71.4	16.5	5.5	4.4	1.1	1.1	0	0	0	0
1895.	Cases	2,359	100	36.6	38.2	14.7	5.3	2.1	1.3	1.0	.5	.04	.3
	Deaths	83	100	60.2	19.3	10.9	7.2	2.4	0	0	0	0	0
1892–5.	Cases	10,452	100	35.3	38.7	15.8	5.4	2.0	1.2	.8	.4	.2	.2
	Deaths	468	100	57.7	26.1	10.3	3.2	1.5	.4	.4	0	.4	0

* In this column *cases* include both *fatal* and *non-fatal* cases.

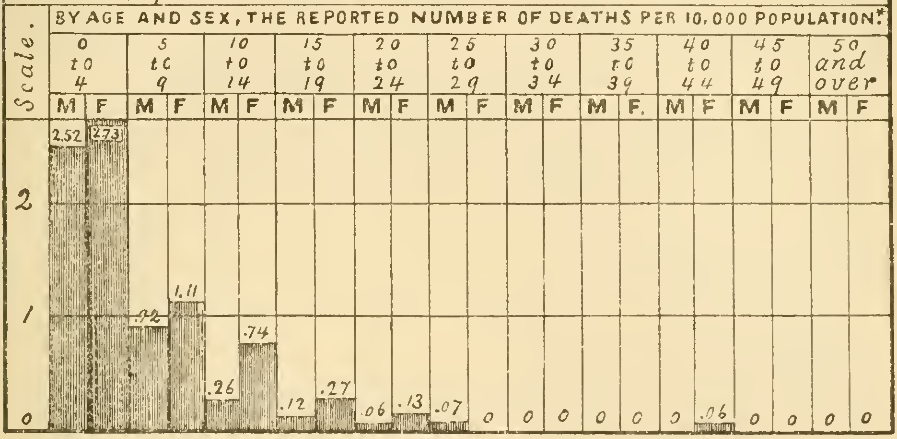
The fourth line of this table (13) shows that the greatest fatality from this disease was in children under five years of age. In seventy-four cases of persons over twenty-five years of age there were no deaths reported.

The per cent the cases and deaths in the age-periods were of all the cases and deaths, in which the ages were stated in the health officers' reports, is given also in Table 14. This table (14) also shows the percentages for the same age-periods for each of the years, 1892–95, and for the four years, 1892–95, combined.

TABLE 15.—*Exhibiting by Sex, in Age-groups, for the three years 1893–5, the Population, the Number of Deaths from Scarlet Fever in Michigan, and the Average Annual Number of Deaths per 10,000 of population of corresponding Sex and Age.*

Age in periods of years.	Sex.	Population, three years, 1893–5, being three times the annual average.	Number of deaths during the three years, 1893–5.	Annual average death-rate per 10,000 population of corresponding sex and age.
0 to 4	Males	404,831	102	2.52
	Females	387,626	106	2.73
5 to 9	Males	377,513	35	.93
	Females	369,949	41	1.11
10 to 14	Males	349,496	9	.26
	Females	339,943	25	.74
15 to 19	Males	331,967	4	.12
	Females	331,257	9	.27
20 to 24	Males	314,826	2	.06
	Females	311,225	4	.13
25 to 29	Males	289,680	2	.07
	Females	272,122	0	00
30 to 34	Males	268,779	0	00
	Females	240,367	0	00
35 to 39	Males	245,701	0	00
	Females	222,741	0	00
40 to 44	Males	203,803	0	00
	Females	173,897	1	.06
45 to 49	Males	174,338	0	00
	Females	150,119	0	00
50 and over	Males	520,709	0	00
	Females	454,046	0	00

Diagram 3.—Exhibiting, by Age and Sex, the Average Annual number of reported deaths from Scarlet fever per 10,000 persons* living in Michigan during the three years, 1893–95. Compiled from all reports to the Secretary of the State Board of Health, for the years mentioned, which stated the age and sex of persons who died of Scarlet fever.



*Of corresponding sex and age.

[PLATE 867]

From Table 16 it may be seen that the ages of 39 males and 44 females who died from scarlet fever in 1895 were given. Of these, 89.7 per cent of males and 90.9 per cent of females died before reaching the sixteenth year of age,—64.1 per cent of males and 56.8 per cent of females having died before reaching the sixth year of age. The fatality in females in the age-period, 10 to 15 years, was seven times that of males in the same period.

The average age of males who died from scarlet fever in 1895 was 6.2 years, of females, 6.8 years. The average age at which both sexes died was 6.6 years.

From Table 17 it may be seen that of the 1,057 males reported to have recovered from scarlet fever in 1895, whose ages were given, 92 per cent were sick before reaching the age of sixteen years; and of the 1,219 females, whose ages were given, 87.4 per cent were sick before reaching the same age; that the average age of males who recovered from scarlet fever was 7.8 years, for females 9.1 years and for both sexes, 8.5 years.

TABLE 16.—*Exhibiting, by Sex for each year of Age, and in certain Age-groups, the number of persons who died from Scarlet Fever during the year 1895, and the per cent the deaths in each Age-group were of deaths at all ages. (Compiled from such reports to the State Board of Health, as stated the sex and age.)*

Sex.	Ages in Years, and groups of Years.	All ages.	Number and per cent of Deaths by Sex, in certain Age-periods.																					
			0-5.					5-10.					10-15.					15-20.					21 years and over.	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Males.	No. of Deaths, by single Years	....	3	6	3	7	6	2	2	2	1	2	0	0	0	0	1	0	1	1	1	0	1	0
	No. of Deaths, by Groups of Years	39	25					9					1					3					1	
	Per cent the Deaths in each age-group were of the total deaths* among Males	....	64.1					23.1					2.6					7.7					2.6	
	Average age at Death, from Scarlet Fever	6.2																						
Females.	No. of Deaths, by single years.	....	7	4	4	7	3	2	1	3	0	1	2	1	2	2	1	1	0	1	1	0	0	1
	No. of Deaths, by Groups of Years	44	25					7					8					3					1	
	Per cent the Deaths in each age-group were of the total deaths* among Females	....	56.8					15.9					18.2					6.8					2.3	
	Average age at Death, from Scarlet Fever	6.8																						
Both Sexes.	No. of Deaths, by single years	....	10	10	7	14	9	4	3	5	1	3	2	1	2	2	2	1	1	2	2	0	1	1
	No. of Deaths, by Groups of Years	83	50					16					9					6					2	
	Per ct. the Deaths in each age-group were of the total deaths* of both sexes	....	60.2					19.3					10.9					7.2					2.4	
	Average age at Death, from Scarlet Fever	6.6																						

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* Deaths from Scarlet Fever.

TABLE 17.—*Exhibiting, by Sex for each year of Age, and in certain Age-groups, the number of persons who Recovered from Scarlet Fever during the year 1895, and the per cent the Non-fatal cases in each Age-group were of Non-fatal cases at all ages. (Compiled from such reports to the State Board of Health, as stated the sex and age.)*

Sex.	Ages in Years, and groups of Years.	Number and per cent of Non-fatal cases by Sex, in certain Age-periods.																										
		All Ages.	0–5.					5–10.					10–15.					15–20.					20–25.					26 years and over.
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	
Males.	No. of Non-fatal cases, by single Years	-----	62	74	97	103	82	107	91	76	77	60	39	42	25	20	17	13	13	5	5	6	0	8	4	4	3	24
	No. of Non-fatal cases, by Groups of Years	1,057	418					411					143					42					19					24
	Per cent the Non-fatal cases in each age-group were of the total Non-fatal cases among Males	-----	39.5					38.9					13.5					4.0					1.8					2.3
	Average age of Non-fatal cases of Scarlet Fever	7.8																										
Females.	No. of Non-fatal cases, by single Years	-----	48	55	94	102	97	125	105	113	64	68	53	61	32	24	24	25	10	19	8	14	8	6	5	6	3	50
	No. of Non-fatal cases, by Groups of Years	1,219	396					475					194					76					28					50
	Per cent the Non-fatal cases in each age-group were of the total Non-fatal cases among Females	-----	32.5					39.0					15.9					6.2					2.3					4.1
	Average age of Non-fatal cases of Scarlet Fever	9.1																										
Both Sexes.	No. of Non-fatal cases, by single Years	-----	110	129	191	205	179	232	196	189	141	128	92	103	57	44	41	38	23	24	13	20	8	14	9	10	6	74
	No. of Non-fatal cases, by Groups of Years	2,276	814					886					337					118					47					74
	Per ct. the Non-fatal cases in each age-group were of the total Non-fatal cases in both sexes	-----	35.8					38.9					14.8					5.2					2.1					3.3
	Average age of Non-fatal cases of Scarlet Fever	8.5																										

AVERAGE DURATION OF SCARLET FEVER. FATAL AND NON-FATAL CASES.

TABLE 18.—*Exhibiting, by sex of patient, by per cent of cases which died in specified periods of time, the duration (in days) of fatal cases of sickness from Scarlet Fever, in Michigan, during the years 1893–95. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of Scarlet Fever.														
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per cent of Deaths in each Period of Days.											
			All Periods.	0 to 5.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	51 days and over.
1893.	Males	60	100	38.3	28.3	8.3	8.3	10.	1.7	1.7	0	0	0	3.3
	Females	82	100	41.5	22.0	14.6	9.8	6.1	1.2	1.2	0	0	2.4	1.2
1894.	Males	37	100	35.1	24.3	18.9	2.7	2.7	2.7	2.7	0	5.4	0	5.4
	Females	42	100	40.5	26.2	19.0	2.4	7.1	2.4	0	0	2.4	0	0
1895.	Males	25	100	44.0	20.0	12.0	8.0	4.0	8.0	0	4.0	0	0	0
	Females	35	100	40.0	28.6	11.4	2.9	2.9	5.7	2.9	2.9	2.9	0	0
1893–5.	Males	122	100	38.5	25.4	12.3	6.6	6.6	3.3	1.6	.8	3.3	0	3.3
	Females	159	100	40.9	24.5	15.1	6.3	5.6	2.5	1.3	.6	2.5	0	.6

From Table 18 it may be seen that of the fatal cases of scarlet fever in the three years, and each of the three years, 1893–5, of which the interval between the day of being taken sick and the day of death was given, the largest per cent died before the sixth day of sickness; and the next highest per cent died in the period from 6 to 10 days.

The average duration of sickness for fatal cases of scarlet fever in 1895 was between ten and eleven days for both males and females.

From Table 19 it may be seen that of the non-fatal cases of scarlet fever in the three years and each of the three years, 1893–5, of which the interval between the day of being taken sick and the day of recovery was given, the greatest per cent were sick from six to twenty-one days, and that the duration in each five-day period, for the three years, was nearly the same for both sexes.

The average duration of sickness in non-fatal cases of scarlet fever in 1895 was between twenty and twenty-one days for both sexes.

TABLE 19.—*Exhibiting by Sex of patient, by per cent of cases which recovered in specified periods of time, the Duration (in days) of Non-Fatal cases of sickness from Scarlet Fever, in Michigan, during the years 1893-95.* (*Compiled from those reports which stated the length of time the patient was sick.*)

Non-Fatal Cases of Scarlet Fever.														
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per Cent of Cases in each Period of Days.											
			All Periods.	0 to 5.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	Over 50 days.
1893.	Males	687	100	4.8	26.3	23.0	14.0	11.6	9.0	3.8	3.5	1.6	1.3	1.0
	Females	809	100	4.1	24.7	24.8	16.1	10.1	11.5	3.7	1.7	2.0	.2	1.0
1894.	Males	761	100	2.2	21.6	28.4	19.8	8.3	7.8	5.3	2.2	2.8	1.1	.7
	Females	899	100	3.7	18.7	26.5	20.2	11.7	6.7	5.9	2.8	2.2	.4	1.2
1895.	Males	577	100	4.9	17.1	19.8	16.8	13.5	9.2	6.1	6.1	3.8	.9	1.9
	Females	689	100	3.9	17.1	21.3	15.4	11.2	8.6	10.1	6.1	3.9	1.5	1.0
1893-5.	Males	2,025	100	3.9	21.9	24.1	17.0	10.9	8.6	5.0	3.8	2.7	1.1	1.1
	Females	2,397	100	3.9	20.3	24.4	17.4	11.0	8.8	6.3	3.4	2.6	.7	1.1

RÖTHELN (GERMAN MEASLES) IN MICHIGAN IN 1895.

During the year ending December 31, 1895, there were reported to the Secretary of the State Board of Health 22 outbreaks of rötheln, in 20 localities, resulting in 240 cases and no deaths.

The following is a list of localities from which rötheln was reported:—

Casco Tp., Allegan Co.; Johnston Tp., Barry Co.; Leroy Tp., and Marshall city, Calhoun Co.; Chester Tp., Eaton Co.; Flint city, Genesee Co.; Traverse City, Grand Traverse Co.; Port Austin Vil., Huron Co.; Hanover Tp. and Rives Tp., Jackson Co.; Kalamazoo city, Vicksburg Vil. and Galesburg Vil., Kalamazoo Co.; Sand Lake Vil., Kent Co.; Marilla Tp., Manistee Co.; Milan Tp., Monroe Co.; Free Soil Tp., Mason Co.; South Haven city, Van Buren Co.; Unionville Vil., Tuscola Co.; and Trenton Vil., Wayne Co.

The grestest prevalence of this disease was reported during the months of March, April and May. In localities where rötheln was reported to be epidemic many of the reports of the local health officers stated that owing to the mild nature of the disease cases were not reported, children were taken in school, and, in most instances, no effort was made to restrict the spread of the disease. The main reason for the restriction of rötheln is the fact that scarlet fever is so often mistaken for rötheln, so that in restricting what is apparently rötheln a more fatal disease is sometimes restricted.

In all cases the public health should be given the benefit of any doubt, and precaution taken against the spread of any contagious disease which may prove to be dangerous.

MEASLES IN MICHIGAN.—DURING THE YEAR ENDING DECEMBER 31, 1895.

There were reported to the Secretary of the State Board of Health, in all, 268 outbreaks of measles, in 239 local jurisdictions, as having occurred in Michigan during the year 1895; and in these outbreaks there were reported to have occurred 3,870 cases and 12 deaths. For the preceding year, 1894, there were reported 10,518 cases and 55 deaths in 339 local jurisdictions. The Office of the State Board of Health is making almost constant efforts to get local health officials to take measures to prevent the spread of measles, and to make reports to this Office concerning that disease in their localities, but it is probable that a large proportion of the actual numbers of cases and deaths are not reported, as in the year 1895 the returns made to the Secretary of State showed 44 deaths due to measles, while reports to the Secretary of the State Board of Health showed only 12 deaths from that disease. It is probable that not all deaths are reported to the Secretary of State; the Secretary of the State Board of Health has estimated that the deaths returned should be increased by at least forty per cent, to make them equal the actual number.

MEASLES IN 1895, COMPARED WITH PREVIOUS YEARS.

According to Reports made to the Secretary of the State Board of Health.

TABLE 1.—*Exhibiting the numbers of outbreaks, cases and deaths from Measles, the Number of localities in which they occurred, together with the average numbers of cases and deaths per outbreak, and the per cent of cases which proved fatal, reported to the Office of the State Board of Health for each of the 6 years, 1890-95; with the departure of the same for 1895, from 1894, and from the average of the same for the 5 years, 1890-94.*

Year.	Reported Outbreaks.	Reported Localities.	Reported Cases.	Av. No. of Cases per Outbreak.	Reported Deaths.	Av. No. of Deaths per Outbreak.	Deaths per 100 Cases.
1890	421	407	*11,911	28.3	140	.33	1.2
1891	394	379	*12,173	30.9	149	.38	1.2
1892	238	229	* 3,830	16.1	76	.32	2.0
1893	365	326	* 7,334	20.1	119	.33	1.6
1894	359	339	10,518	29.3	55	.15	.5
1895	268	239	3,870	14.4	12	.04	.3
Average for 5 years, 1890-1894	355	336	9,153	24.9	108	.30	1.3
Departure of 1895 from 1894	−91	−100	−6,648	−14.9	−43	−.11	−.2
Departure of 1895 from the average for 5 years, 1890-94	−87	−97	−5,283	−10.5	−96	−.26	−1.0

* Only the fatal cases were reported from Detroit.

The compilation of information relative to the prevalence of measles in Michigan, as reported to the Office of the Secretary of the State Board of Health, has been continued for a number of years.

In Table 1, beginning with the year 1890, are shown, by years, the numbers of reported outbreaks of measles, the numbers of infected localities, the numbers of cases and deaths reported as having occurred from this disease in each year, the average reported cases and deaths per outbreak, and the per cent ratio of deaths to cases. There is marked fluctuation from year to year in the prevalence of this disease, according to the reports to the Secretary of the State Board of Health.

According to the Reports Made to the Secretary of State.

Table 2, showing the number of deaths from measles per 100,000 persons living, reported to the Secretary of State, probably quite accurately represents the annual fluctuations of, but not the total death-rate from measles in Michigan during the 28 years, 1868–95. Probably the omissions are about the same in every year, therefore these statistics of the State Department are useful for comparing one year with another. A diagram graphically representing table 2, for the 25 years, 1868–92, can be seen on page 336 of the Report of this Board for 1895.

TABLE 2.—*Exhibiting the reported number of deaths from measles per 100,000 persons living in Michigan in each of the 28 years, 1868–95. (Compiled from the Secretary of State's Vital Statistics of Michigan. Population estimated by average annual increase.)*

Year.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876	1877.	1878.	1879.	1880.	1881.
Deaths (per 100,000, etc.) ..	8.66	12.88	4.72	5.45	14.12	18.56	3.37	9.50	8.10	4.13	1.03	10.49	7.63	15.21
Year.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.
Deaths (per 100,000, etc.) ..	8.68	14.54	7.91	2.04	6.75	14.56	20.62	5.08	10.94	10.51	3.29	5.76	3.75	1.93

DISTRIBUTION OF MEASLES BY DIVISIONS AND COUNTIES DURING 1895.

Table 3 exhibits the distribution of measles in 1895, by tiers of counties of the State according to the reports to the Secretary of the State Board of Health; showing the reported numbers of cases and sickness-rates for each division. Table 4 and the accompanying map exhibit in slightly different ways the reported measles by counties during the year 1895, the reported numbers of cases and deaths, and the sickness and death-rates are shown in Table 4.

TABLE 3.—*Exhibiting the Population of Michigan for the year 1895, by tiers of counties (Upper Peninsula as one tier); also the number of cases of Measles* REPORTED *from each of these divisions for 1895, and the number of cases per 10,000 population of each division.*

Counties in Groups, most Northern ones First.		Estimated Population, 1895 *	Reported Cases of Measles, 1895.	Reported Cases per 10,000 of Population.
State		2,278,579	3,870	17.0
Upper Peninsula	Alger. Mackinac. Delta. Chippewa. Schoolcraft. Keweenaw. Luce. Marquette. Houghton. Iron. Ontonagon. Menominee. Gogebic. Dickinson. Baraga.	213,073	143	6.7
Eleventh tier of counties	Emmet. Cheboygan. Charlevoix. Presque Isle.	43,372	86	19.8
Tenth tier of counties	Leelanaw. Antrim. Otsego. Alpena. Montmorency.	48,721	22	4.5
Ninth tier of counties	Benzie. Crawford. G'd Traverse. Oscoda. Kalkaska. Alcona.	42,933	175	40.8
Eighth tier of counties	Manistee. Wexford. Ogemaw. Missaukee. Iosco. Roscommon.	67,590	27	4.0
Seventh tier of counties	Mason. Gladwin. Lake. Bay. Osceola. Huron. Clare. Arenac.	157,735	555	35.2
Sixth tier of counties	Oceana. Newaygo. Mecosta. Midland. Isabella.	92,559	14	1.5
Fifth tier of counties	Muskegon. Montcalm. Tuscola. Gratiot. Sanilac. Saginaw.	250,905	513	20.4
Fourth tier of counties	Ottawa. Shiawassee. Kent. Genesee. Ionia. Lapeer. Clinton. St. Clair.	384,315	1,130	29.4
Third tier of counties	Allegan. Barry. Livingston. Eaton. Oakland. Ingham. Macomb.	231,765	140	6.0
Second tier of counties	Van Buren. Kalamazoo. Washtenaw. Calhoun. Wayne. Jackson.	514,449	644	12.5
First tier of counties	Berrien. Hillsdale. Cass. Lenawee. St. Joseph. Monroe. Branch.	231,167	421	18.2

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* Population estimated by average annual increase (arithmetical method), based on U. S. Census of 1890 and the State Census of 1894.

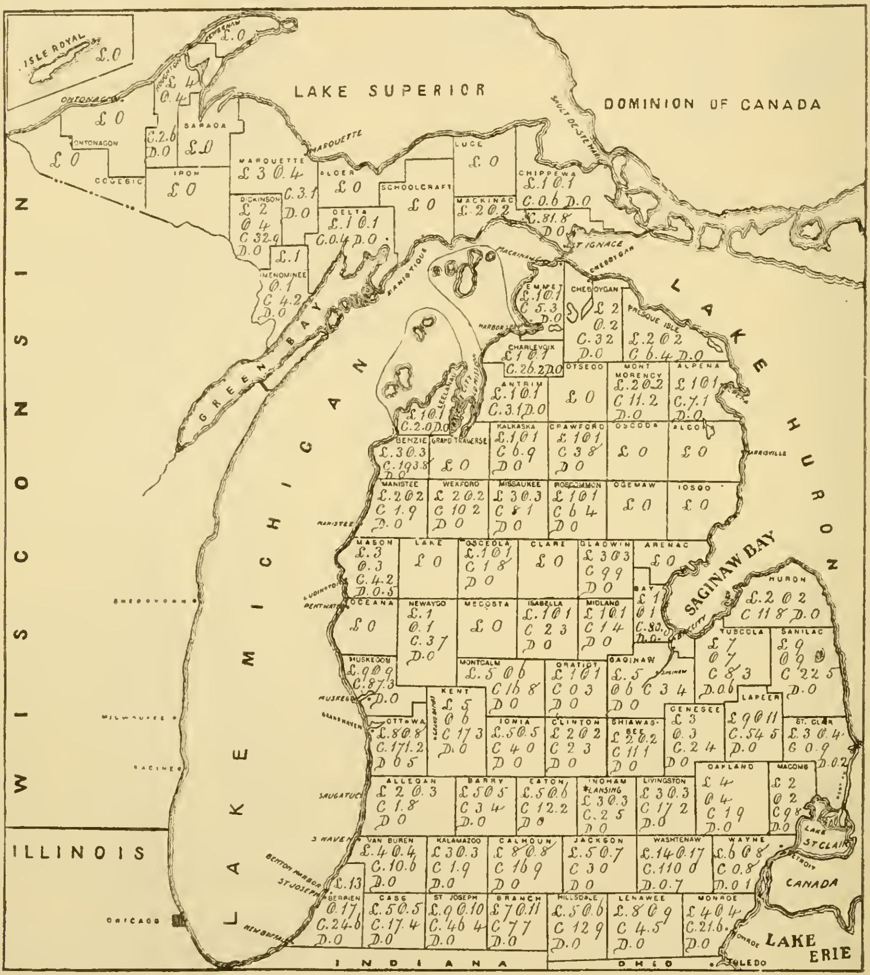
TABLE 4.—*Numbers of Cases and Deaths reported from Measles per 10,000 persons living in each county in Michigan during the year 1895. (Compiled from reports of health officers, clerks, etc.)*

State and counties.	Estimated Population of Michigan for 1895.*	Number of reported		Number per 10,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.
State	2,278,579	3,870	12	17.0	.05
Alcona	5,420	0	0	0	0
Alger	1,422	0	0	0	0
Allegan	39,246	7	0	1.8	0
Alpena	18,251	13	0	7.1	0
Antrim	12,931	4	0	3.1	0
Arenac	7,258	0	0	0	0
Baraga	4,531	0	0	0	0
Barry	23,678	8	0	3.4	0
Bay	62,527	500	0	80.0	0
Benzie	8,770	170	0	193.8	0
Berrien	46,723	115	0	24.6	0
Branch	26,061	20	0	7.7	0
Calhoun	48,465	82	0	16.9	0
Cass	21,232	37	0	17.4	0
Charlevoix	11,464	30	0	26.2	0
Cheboygan	14,379	46	0	32.0	0
Chippewa	16,148	1	0	.6	0
Clare	8,081	0	0	0	0
Clinton	26,200	6	0	2.3	0
Crawford	2,647	1	0	3.8	0
Delta	20,245	1	0	.4	0
Dickinson	14,887	49	0	32.9	0
Eaton	32,749	40	0	12.2	0
Emmet	11,312	6	0	5.3	0
Genesee	40,834	10	0	2.4	0
Gladwin	5,073	5	0	9.9	0
Gogebic	14,312	0	0	0	0
G'd Traverse	18,555	0	0	0	0
Gratiot	28,803	1	0	.3	0
Hillsdale	30,175	39	0	12.9	0
Houghton	46,338	12	0	2.6	0
Huron	33,184	39	0	11.8	0
Ingham	40,195	10	0	2.5	0
Ionia	35,325	14	0	4.0	0
Iosco	11,619	0	0	0	0
Iron	5,360	0	0	0	0
Isabella	22,103	5	0	2.3	0
Jackson	46,911	14	0	3.0	0
Kalamazoo	42,752	8	0	1.9	0
Kalkaska	5,760	4	0	6.9	0
Kent	124,942	216	0	17.3	0
Keweenaw	2,783	0	0	0	0
Lake	5,745	0	0	0	0
Lapeer	28,795	157	0	54.5	0
Leelanaw	9,938	2	0	2.0	0
Lenawee	48,564	22	0	4.5	0
Livingston	20,332	35	0	17.2	0
Luce	2,321	0	0	0	0
Mackinac	7,089	58	0	81.8	0
Macomb	32,531	32	0	9.8	0
Manistee	26,585	5	0	1.9	0
Marquette	38,490	12	0	3.1	0
Mason	18,931	8	1	4.2	.5
Mecosta	20,987	0	0	0	0
Menominee	24,041	10	0	4.2	0
Midland	13,858	2	0	1.4	0
Missaukee	7,432	6	0	8.1	0
Monroe	33,392	72	0	21.6	0
Montcalm	34,538	58	0	16.8	0
Montmorency	2,676	3	0	11.2	0
Muskegon	36,652	320	0	87.3	0
Newaygo	18,787	7	0	3.7	0
Oakland	43,034	8	0	1.9	0
Oceana	16,824	0	0	0	0
Ogemaw	5,652	0	0	0	0
Ontonagon	7,652	0	0	0	0
Osceola	16,936	3	0	1.8	0
Oscoda	1,781	0	0	0	0
Otsego	4,925	0	0	0	0
Ottawa	40,014	685	2	171.2	.5
Presque Isle	6,217	4	0	6.4	0
Roscommon	1,563	1	0	6.4	0
Saginaw	81,740	28	0	3.4	0
Sanilac	34,284	77	0	22.5	0
Schoolcraft	7,454	0	0	0	0
Shiawassee	33,330	37	0	11.1	0
St. Clair	54,875	5	1	.9	.2
St. Joseph	25,020	116	0	46.4	0
Tuscola	34,888	29	2	8.3	.6
Van Buren	31,189	33	0	10.6	0
Washtenaw	43,834	482	3	110.0	.7
Wayne	301,298	25	3	.8	.1
Wexford	14,739	15	0	10.2	0

*Population estimated by average annual increase, (arithmetical method), based on U. S. Census of 1890 and the State Census of 1894.

DISTRIBUTION OF MEASLES IN MICHIGAN IN 1895.

BY COUNTIES, THE REPORTED CASES AND DEATHS PER 10,000 INHABITANTS.



L.= Localities; O.= Outbreaks; C = Cases per 10,000 population; D. = Deaths per 10,000 population.

[PLATE 882]

Sickness-rates from Measles Reported as Having Occurred in 1895.

Considering the State by tiers of counties, Table 3 shows that the greatest reported prevalence of measles was in the ninth tier, where the sickness-rate reached 40.8 cases per 10,000 inhabitants; the next highest sickness-rate (35.2) was in the seventh tier. Other tiers where the sickness-rates were above the average for the State were the fourth, 29.4; the fifth, 20.4; the eleventh, 19.8; and the first, 18.2 cases per 10,000 inhabitants. The lowest sickness-rate 1.5 cases per 10,000 inhabitants, was in the sixth tier.

By counties, the greatest sickness-rate reported from this disease in 1895 was in Benzie county, where the ratio of cases to population was 193.8 per 10,000. Other counties where the sickness-rates were largely in excess of the average rate for the whole State, were: Ottawa 171.2, Washtenaw 110, Muskegon 87.3, Mackinac 81.8, Bay 80, and Lapeer 54.5 cases per 10,000 of population; whereas the average sickness-rate for the State was only 17.0 cases per same number of inhabitants.

From nineteen counties having an aggregate population of 152,682 there was no measles reported during the year.

Death-rates from Measles Reported as having Occurred in 1895.

The number of deaths from measles reported to this Office for the year 1895, were so few that columns showing the deaths and death-rates have not been placed in Table 3, but in Table 4 the numbers of cases and deaths and the sickness-rates and death-rates are given for each county in the State, where cases of sickness or deaths from this disease were reported to have occurred.

The greatest reported death-rate from measles during the year, .7 of one death per 10,000 of population, was in Washtenaw county. Other counties where the death-rates were much above the average death-rate for the State, were: Tuscola .6, Ottawa and Mason each .5. The death-rate for the State was only .05; this death-rate is probably much too low, as the estimate is made by calling the 12 deaths from measles, reported to the Office of the State Board of Health, the total number for the State; but there were 44 deaths from measles reported to the Secretary of State in the same year, 1895.

The Fatality, or "Case-Mortality" from Measles.

The fatality from measles in 1895, *i. e.*, the proportion of reported cases which proved fatal, was for the whole State, .3 per cent, or a little more than 3 deaths to every 1,000 cases reported. The maximum fatality (20 per cent) occurred in St. Clair county, where the reports to this Office show only 5 cases of measles with one death; the next highest fatality was in Wayne county (12 per cent); the reports from that county gave only 25 cases with 3 deaths. It is quite probable that these reported deaths are nearly correct, and that the reported cases are only a small part of the numbers which actually occurred in St. Clair and Wayne counties.

NUMBER OF OUTBREAKS OF MEASLES IN EACH MONTH OF THE YEAR 1895.

TABLE 5.—*Exhibiting the reported number of outbreaks of Measles which Began, the number which Ended, and the number which were Present, in each Month of the Year 1895, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Number began	23	14	23	34	28	35	12	11	9	5	9	19	222
Number ended	7	13	12	13	25	31	24	10	13	3	6	22	179
Number present	29	34	39	52	63	67	42	30	26	15	20	34	....

The last line of figures in Table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. Frequently the beginning of an outbreak is reported but the end of the outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months. There were 43 more beginnings than endings of outbreaks reported during the year 1895.

TABLE 6.—*Exhibiting the Number and Per Cent of Cases of Measles in Michigan in each Month during the Year 1895. (Includes each case for which, the time during which it existed, was stated in the reports. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.)*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number of cases present	99	161	191	240	326	250	145	121	83	120	409	370
Per cent of cases present	2.6	4.2	4.9	6.2	8.4	6.5	3.7	3.1	2.1	3.1	10.6	9.6

The first line of figures in Table 6, exhibits the number of cases reported sick in each month or any part of the month.

The last line of figures in this table, exhibits the per cent the cases sick in each month are of the whole number of cases reported to this Office for the year 1895.

SOURCE OF CONTAGIUM OF CASES OF MEASLES.

Of the 3,870 cases of measles reported to this Office, as having occurred in the year 1895, the local health officials reported relative to the source of contagium in ways which may be summarized as follows:—Traced to a former case, 706; from outside jurisdiction, 64; unknown, 2,299; not stated, 801; total 3,870.

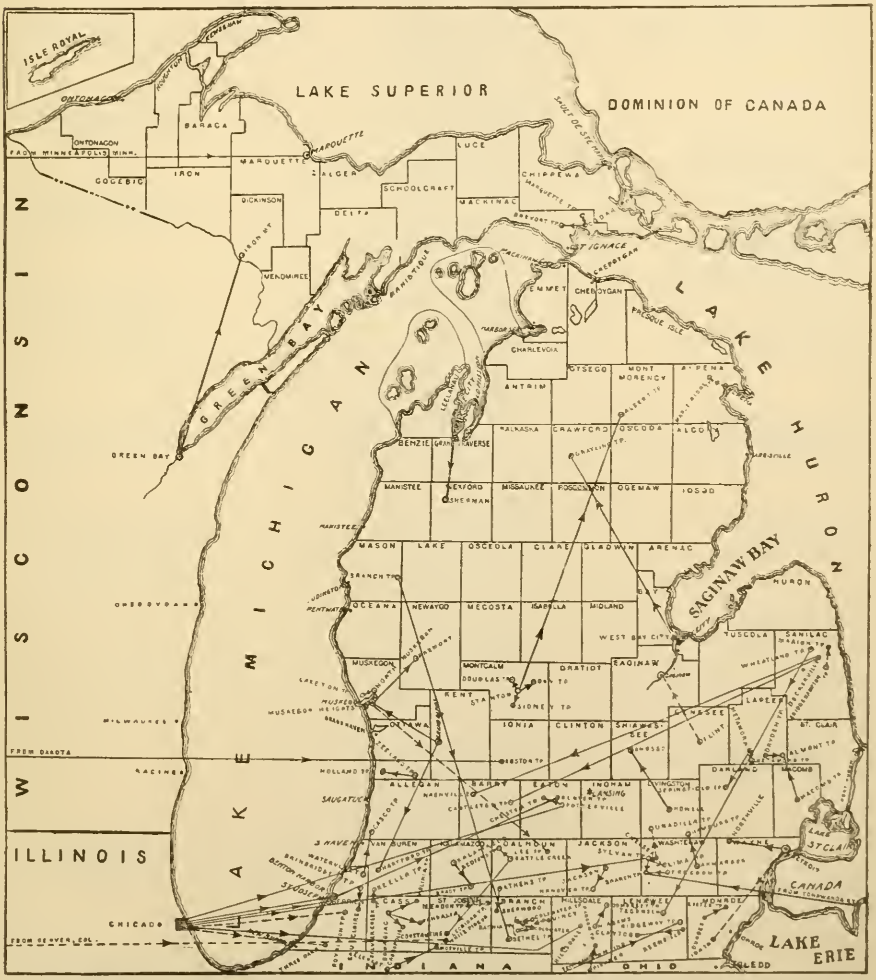
TABLE 7.—*Reported Source of Contagium of Cases of Measles in Michigan during the year 1895.*

	Cases.
Traced to a former case	706
Reported as coming from outside jurisdiction	64
Unknown (includes reported "epidemic," "exposure," "sporadic")	2,299
Not stated	801
All cases	3,870

MOVEMENTS OF CONTAGIUM OF MEASLES IN MICHIGAN IN 1895.

On the accompanying map, the spread of measles in Michigan in the year 1895, as reported to this Office is shown by black lines which connect the localities; the arrow-head indicates the direction of the movement in each case. The source of this information is given in the list of "extracts from reports of health officers" with the name and address of each health officer who traced the source of contagium in his jurisdiction to some outside jurisdiction. Tabular statements relating to these instances are in Table 8. Consecutive numbers in the first column of Table 8, preceding each "First Locality" from which measles spread, refer to corresponding consecutive numbers preceding the paragraphs in the "extracts from reports of health officers," under the sub-head "*Outbreaks of Measles Traced to Other Jurisdictions.*"

MOVEMENTS OF CONTAGIUM OF MEASLES IN 1895.



THIS MAP ILLUSTRATES TABLE 8. LINES CONNECT THE LOCALITIES INEECTED. THE ARROWHEADS INDICATE THE DIRECTIONS OF THE MOVEMENTS.

——→ DEFINITELY TRACED. – – –→ PROBABLY TRACED.

[PLATE 884]

TABLE 8.—*First, second and third localities, where the second locality was infected with Measles from the first, and the third was infected from the second; and the numbers of cases and deaths from Measles in the first, second and third localities, with the dates of the beginning and ending of each outbreak.* (*Compiled from reports of health officers who were able to trace the source of contagium to other localities.*)

Number.*	First Localities from which Measles was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
1	Bay county: West Bay City	†	----	Bay county: Bay City (Aug. —.)	500	0			
				Crawford county: Grayling township (Dec. 8-Dec. 22.)	1	0			
2	Berrien county: Bainbridge township.	1	0	Berrien county: Eau Claire village (Feb. 20 —.)	16	0			
3	Berrien county: Watervliet village (Apr. 3-July 26.)	25	0	Allegan county: Casco township (Aug. 14-Sept. 4.)	5	0			
4	Branch county: Coldwater city (May 9-May 20.)	2	0	Branch county: Batavia township (June 7-June 20.)	1	0			
				Batavia township	1	0			
5	Branch county: Coldwater township	†	----	Branch county: Batavia township (May 5-May 13.)	1	0			
6	Calhoun county: Athens township	†	----	Branch county: Sherwood village (July-July.)	3	0			
7	Calhoun county: Battle Creek city (Mar. 13 —.)	33	0	Calhoun county: Bedford township (May 19-July 20.)	36	0			
				St. Joseph county: Constantine village (June 6-June 12.)	4	0			
8	Cass county: Dowagiac city	†	----	Cass county: Cassopolis village (May 9-June 15.)	4	0			
				Vandalia village (Apr. 25-May 20.)	3	0			
				Volinia township Apr. 22-May 7.)	7	0			
9	Cass county: Silver Creek township	18	0	Van Buren county: Keeler township (Feb. 25-Apr. 13.)	17	0			
10	G'd Traverse county: Traverse City	†	----	Wexford county: Sherman village (Apr. 5-Apr. 10.)	1	0			
11	Hillsdale county: North Adams village	†	----	Hillsdale county: Somerset township (Apr. 23-May 1.)	1	0			
12	Huron county	----	----	Lapeer county: Oregon township (Apr. 5-Apr. 26.)	7	0			
				Sanilac county: Bridgehampton twp. (July 1-July 14.)	1	0			
				Tuscola county: Cass City village (Jan. 29-Feb. 28.)	10	0			

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* The consecutive numbers in this column refer to similar consecutive numbers before the quotations in the text following this table.

† Measles was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there. This may indicate neglect in the locality from which the disease is reported to have spread.

TABLE 8.—CONTINUED.—*Movement of Infection of Measles.*

Number.*	First Localities from which Measles was spread.			Second Localities infected from First.			Third Localities infected from Second		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
13	Jackson county: Jackson city	4	0	Jackson county: Hanover township (Sept. 12-Sept. 21.)	1	0			
14	Kalamazoo county: Kalamazoo city (Apr.-Apr. 27.)	2	0	Kalamazoo county: Brady township (Apr.-Apr. 10.)	1	0			
15	Kent county: Grand Rapids city (Jan.-July.)	190	0	Muskegon county: Muskegon city (Jan. 21-May, 1896.)	362	1	Muskegon county: Muskegon Heights vil.	2	0
							Newaygo county: Fremont village (July 30-Sept. 1.)	7	0
				Van Buren county: Hartford township	1	0			
16	Lapeer county: Dryden township (May —.)	6	0	Lapeer county: Almont township (June 16 —.)	3	0			
17	Lapeer county: Metamora village (Mar. 30-May 18.)	57	0	Lapeer county: Metamora township (Apr. 4-May 3.)	8	0			
				Oakland county: Springfield township (May 2-May 19.)	4	0			
18	Lenawee county: Deerfield village	†	----	Lenawee county: Clayton village (June 16-June 25)	2	0			
19	Livingston county: Howell village	†	----	Shiawassee county: Owosso city (June 10-June 20.)	1	0			
20	Mackinac county: Cedar township	†	----	Mackinac county: Brevort township (Mar. 3-July 20.)	53	0			
				Marquette township (Jan.-Feb.)	5	0			
21	Macomb county: Macomb township	†	----	Lapeer county: Almont township (June 27-July 20.)	3	0			
22	Mason county: Branch township	†	----	Branch county: Bethel township (Aug. 11-Sept. 22.)	2	0			
23	Monroe county: Dundee village	†	----	Monroe county: Exeter township (Jan.-Feb. 22.)	25	0			
24	Montcalm county	----	----	Ionia county: Ionia city (July 17-July 29.)	1	0			
25	Montcalm county: Stanton city (— July.)	40	0	Montcalm county: Day township (July 30-Aug. 10.)	1	0			
				Douglas township (May 9-June 7.)	4	0			
				Sidney township (June 5-Aug. 15.)	10	0			
				Montmorency county: Albert township (June 23 —.)	2	0			
26	Muskegon county: North Muskegon city (Dec.-Feb., 1896.)	117	0	Muskegon county: Laketon township (Dec. 27-Mar., 1896.)	22	0			

* † These foot-notes are on the bottom of the first page of this table.

TABLE 8.—Continued.—*Movement of Infection of Measles.*

Number.*	First Localities from which Measles was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
27	Ottawa county: Zeeland township	1	0	Ottawa county: Holland township (Aug. 4-Aug. 19.)	3	0			
28	Sanilac county: Deckerville village (June 20-July 15.)	3	0	Barry county: Castleton township	2	0			
				Nashville village (June 26-July 4.)	1	0			
29	Sanilac county: Wheatland township	†	----	Lenawee county: Tecumseh village (Sept. 6-Oct. 2.)	3	0			
30	St. Joseph county: Mendon township	†	----	St. Joseph county: Leonidas township (Nov.-Feb. 5, 1896.)	9	0			
31	Washtenaw county: Ann Arbor city	†	----	Livingston county: Hamburg township (Mar. 21-Mar. 29.)	2	0			
32	Washtenaw county: Freedom township	10	1	Washtenaw county: Sharon township (— June 22.)	22	0			
33	Wayne county: Detroit city (Jan., '95-Jan. 6, '96.)	14	2	Wayne county: Northville village (Apr. 13-May 10.)	2	0			
	(*Movement of infection of Measles* Into Michigan *from outside the State.*)								
34	Chicago	----	----	Berrien county: Benton Harbor city (June-Sept.)	9	0	Eaton county: Benton township (July 19-Aug 23.)	2	0
				St. Joseph city (June 1-June 12.)	2	0			
				Eaton county: Potterville village (Jan.-Feb. 4.)	2	0	Eaton county: Chester township (Jan. 15-Apr. 25.)	26	0
				Hillsdale county: Hillsdale city (Apr. 23-May 21.)	2	0			
				Washtenaw county: Sylvan township (Mar. 5-July 1.)	48	0	Washtenaw county: Chelsea village (Apr. 1-Apr. 15.)	100	1
							Lima township (Mar. 19-July 28.)	111	0
							Sharon township (Apr. —.)	12	0
35	Dakota	----	----	Ionia county: Boston township (Dec. 25, '94-Jan. 31.)	5	0			
36	Indiana: Elkhart	----	----	St. Joseph county: Mottville township (Aug. 12-Aug. 15.)	1	0			
37	Indiana: Hamilton	----	----	Lenawee county: Ridgeway township (Apr. 20-May 20.)	3	0			
38	Minneapolis	----	----	Marquette county: Marquette city (June-July.)	1	0			
39	New York: Tonawanda	----	----	Washtenaw county: Sharon township (June 16 —.)	1	0			
40	Ohio	----	----	Berrien county: Buchanan village (Nov. 18-Apr. 28 '96.)	60	0			
41	Ohio: Pioneer	----	----	Hillsdale county: Ransom township (May 7-May 27.)	4	0			
42	Wisconsin: Green Bay	----	----	Dickinson county: Iron Mountain city (June 8-June 22.)	1	0			

* † These foot-notes are on the bottom of the first page of this table.

TABLE 8.—Concluded.—**Probable** *Movement of Infection of Measles.*

Number.*	First Localities from which Measles was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
43	Alpena county: Alpena city	†	--	Alpena county: Maple Ridge twp. (June 11-Nov. 23.)	13	0			
44	Branch county: Quincy village	†	---	Branch county: Batavia township (June 20-July 8.)	1	0			
45	Genesee county: Flint city (Apr. 20-May 4.)	2	0	Saginaw county: Saginaw city (June 5-June 27.)	1	0			
46	Jackson county	----	----	Hillsdale county: Somerset township (Mar. 10-Mar. 21.)	1	0			
47	Muskegon county: Muskegon city (Jan. 21-May, 1896.)	362	1	Calhoun county: Lee township (Dec. 3-Jan. 6, 1896.)	3	0			
48	Sanilac county: Bridgehampton twp. (July 1-July 14.)	1	0	Sanilac county: Marion township (July 15-July 26.)	1	0			
49	Washtenaw county: Chelsea village (Apr. 1-Aug. 15.)	100	1	Livinsgton county: Unadilla township (Apr. 4-May 11.)	30	0			
50	Wayne county: Detroit city (Jan., '95-Jan. 6, '96.)	14	2	Monroe county: Ida township (Feb.-Mar.)	20	0			
51	Lower Michigan	----	----	Marquette county: Marquette city (Jan. 20-Feb. 21.)	3	0			
	(**Probable** *Movement of Infection* **Into Michigan** *from outside the State.*)								
52	Alabama	----	----	Kalkaska county: Rapid River twp. (Dec. 14-Dec. 31.)	4	0			
53	Chicago	----	----	Berrien county: Royalton township (June 10-Sept. 2.) Three Oaks village (May 24 —.)	 11 6	 0 0			
54	Colorado: Denver	----	----	St. Joseph county: White Pigeon village (Nov. 5-Dec. 20.)	15	0			
55	Ohio	---	----	Jackson county: Spring Arbor twp. (Dec. 6-Apr. 14, 1896.)	82	0			

* † These foot-notes are on the bottom of the first page of this table.

OUTBREAKS OF MEASLES TRACED TO OTHER JURISDICTIONS.

The following are extracts from the reports of health officers who were able to trace the outbreaks of measles in their respective jurisdictions to cases of the disease outside their jurisdictions,—with the name of the health officer, and of the jurisdiction which was the "Second locality," subjoined. In those instances where the disease spread to a third locality, a reference mark and foot-note refer to "Third locality" column in Table 8. These quotations concerning the spread of contagium from first to second, and from second to third localities, are arranged in the same order as the "First localities" in Table 8, thus giving the source of each report in that table.

The consecutive numbers placed before these quotations refer to the same localities as do similar numbers in the first column of Table 8 of this article.

The map on a preceding page graphically exhibits these "movements of measles contagium in the year 1895."

Extracts from Reports of Health Officers.

The following quotations are in answer to the question on the final report "The source of contagium, and the mode of introduction, etc.":—

1. "Came from the village of Banks."—*Wm. Kerr, M. D., Bay City, Bay county.*

1. "From exposure to measles at West Bay City."—*F. E. Wolf, M. D., Grayling township, Crawford county.*

2. "From Spink's Corners [Bainbridge township, Berrien county]."—*S. F. Clark, M. D., Eau Claire village, Berrien county.*

3. "A young lady working at Watervliet, Berrien county, came home sick, not knowing what the disease was or that she had been exposed to measles."—*Sam'l Galbreath, health officer, Casco township, Allegan county.*

4. "From Coldwater city."—*G. A. McMaster, M. D., Batavia township, Branch county.* (Two outbreaks in this jurisdiction both traced to infection from Coldwater.)

5. "By clothing worn by a relative coming to their house from an infected family of Coldwater township."—*G. A. McMaster, M. D., Batavia township, Branch county.*

6. "By exposure to a person with measles from Athens."—*Chas. E. Nelthorpe, M. D., Sherwood village, Branch county.*

7. "A case of measles from Battle Creek jurisdiction stopped at hotel when fully broken out."—*C. C. Smith, M. D., Bedford township, Calhoun county.*

7. "Brought from Battle Creek."——*B. P. Scoville, M. D., Constantine village, St. Joseph county.*

8. "By case coming in contact with cases of measles at Dowagiac."—*A. B. Conklin, M. D., Cassopolis village, Cass county.*

8. "Brought here from Dowagiac."—*Leander Osborn, M. D., Vandalia village, Cass county.*

8. "By a young man attending school at Dowagiac where measles was present."—*C. S. Robinson, M. D., Volinia township, Cass county.*

9. "From Silver Creek township, Cass county"—*Sam'l Stevens, M. D., Keeler township, Van Buren county.*

10. "The disease was brought from Traverse City."—*W. J. Bruce, M. D., Sherman village, Wexford county.*

11. "From North Adams, Mich."—*R. C. Traver, M. D., Somerset township, Hillsdale county.*

12. "Patient was in Huron county at the time and went visiting where said disease was."—*Edward Meyer, M. D., Bridgehampton township, Sanilac county.*

12. "A boy from Huron county stopping at a house over night a short time after recovering from measles."—*N. McClinton, M. D., Cass City village, Tuscola county.*

12. "The oldest son got it in Huron county."—*J. Bohnsack, health officer, Oregon township, Lapeer county.*

13. "From Jackson."—*Walter C. Snyder, M. D., Hanover township, Jackson county.*

14. "From Kalamazoo."—*C. H. McKain, M. D., Brady township, Kalamazoo county.*

15. "I was informed that the first came from Grand Rapids and other cases followed."—*Paul A. Quick, M. D., Muskegon city, Muskegon county.*

15. "Student attending school in Muskegon was infected there."—*M. Mason, M. D., Muskegon Heights village,* Muskegon county.*

15. "By children from here visiting at Muskegon."—*Van N. Miller, M. D., Fremont village,* Newyago county.*

15. "Exposed at Grand Rapids."—*H. C. Maynard, M. D., Hartford township, Van Buren county.*

16. "First case from a school in Dryden township."—*A. Price, M. D., Almont township, Lapeer county.*

17. "From cases occurring in the village of Metamora."—*G. W. Stone, M. D., Metamora township, Lapeer county.*

17. "At Metamora" (Lapeer county).—*Ora Manley, M. D., Springfield township, Oakland county.*

18. "From Deerfield village where the patient was visiting a short time before the attack."—*E. J. C. Ellis, M. D., Clayton village, Lenawee county.*

19. "Child was visiting at Howell, Mich., and was exposed there."—*C. A. Osborne, M. D., Owosso city, Shiawassee county.*

20. "The measles was first brought to this place from Hessel, Cedar township, Mackinac county."—*J. D. Erskine, M. D., Brevort township, Mackinac county.*

20. "From Hessel village [Cedar tp.]."—*Thos. Morrison, health officer, Marquette township, Mackinac county.*

21. "Came to this township after exposure at a school in township of Macomb."—*A. Price, M. D., Almont township, Lapeer county.*

22. "By exposure at the village of Branch."—*Jno. W. Martin, M. D., Bethel township, Branch county.*

23. "A family were visiting at Dundee, where measles were epidemic."—*L. Baldwin, M. D., Exeter township, Monroe county.*

24. "By contagium in Montcalm county."—*Henry Tremayne, M. D., Ionia city, Ionia county.*

25. "The party came from the city of Stanton where they had measles."—*D. E. Bell, M. D., Bay township, Montcalm county.*

25. "The disease was contracted at Stanton so far as can ascertain."—*C. A. Carle, M. D., Douglas township, Montcalm county.*

25. "From Stanton."—*W. G. Palmer, health officer, Sidney township, Montcalm county.*

25. "From Stanton, Mich."—*N. H. Traver, M. D., Albert township, Montmorency county.*

26. "A young lady teacher from the city of North Muskegon, who was coming down with the measles, attended a school entertainment in our township."—*Thos. Dorman health officer, Laketon township, Muskegon county.*

27. "From Zeeland township."—*J. W. Vandenberg, M. D., Holland township, Ottawa county.*

28. "Exposed from case in Deckerville" [Sanilac county].—*W. H. Young, M. D., Castleton township, Barry county.*

29. "Taken from visiting a brother sick with the disease at Deckerville, Mich."—*W. H. Young, M. D., Nashville village, Barry county.*

30. "The first case brought or contracted it from a gathering at a school house in Mendon township."—*W. C. Hontz, M. D., Leonidas township, St. Joseph county.*

31. "Patient was exposed in Ann Arbor."—*J. N. Swartz, M. D., Hamburg township, Livingston county.*

32. "From Kuhl District" [Freedom township].—*W. F. Hall, health officer, Sharon township, Washtenaw county.*

33. "Both patients caught the disease in Detroit."—*P. E. White, health officer, Northville village, Wayne county.*

Movement of Infection in Michigan from Outside the State.

34. "Brought from Chicago."—*F. A. Votey, M. D., Benton Harbor city, Berrien county.*

34. "The first person sick was exposed while at Benton Harbor visiting."—*E. R. Espie, M. D.,* Benton township, Eaton county.*

34. "Came from Chicago."—*W. L. Wilson, M. D., St. Joseph city, Berrien county.*

34. "From visiting person from Chicago."—*E. R. Espie, M. D., Potterville village, Eaton county.*

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* Third locality infected from the second.

34. "Visiting at Potterville."—*J. W. Clement, health officer, Chester township,* Eaton county.*

34. "From Chicago."—*C. W. Harris, M. D., Hillsdale city, Hillsdale county.*

34. "A child coming from Chicago and being where several children came to an auction."—*Geo. W. Palmer, M. D., Sylvan township, Washtenaw county.*

34. "All started from Peter B's, four miles in country" [Sylvan township].—*Geo. W. Palmer, M. D., Chelsea village,* Washtenaw county.*

34. "Brought from the adjoining township, of Sylvan."—*R. B. Gates, M. D., Lima township,* Washtenaw county.*

34. "From Sylvan township."—*Wm. F. Hall, H. O., Sharon township,* Washtenaw county.*

* Third locality infected from the second.

35. "It was brought here from the State of Dakota."—*Chas. Wunch, M. D., Boston township, Ionia county.*

36 "From Elkhart, Ind."—*J. W. B. Fort, M. D., Mottville township, St. Joseph county.*

37. "A lady coming from some place in Indiana [Hamilton] brought two children who had been exposed to the disease before leaving for this point."—*P. B. Hardy, M. D., Ridgeway township, Lenawee county.*

38. "From Minneapolis."—*F. McD. Harkins, M. D., Marquette city, Marquette county.*

39. "Came from Tonawanda, N. Y."—*Wm. F. Hall, health officer, Sharon township, Washtenaw county.*

40. "It was brought here by a lady from Ohio whose child came down as soon as arrived."—*H. M. Brodrick, M. D., Buchanan village, Berrien county.*

41. "From Pioneer, Ohio."—*W. Bates, M. D., Ranson township, Hillsdale county.*

42 "Child was visiting at Green Bay, Wis., and came down with the disease soon after returning home."—*J. A. Crowell, M. D., Iron Mountain city, Dickinson county.*

Outbreaks Probably Traced to Former Outbreaks.

43. "The boy had been at Alpena on a message and perhaps was infected while there."—*James S. Shelby, health officer, Maple Ridge township, Alpena county.*

44. "Went to Quincy, Mich., and in about fifteen days showed signs of measles."—*G. A. McMaster, M. D., Batavia township, Branch county.*

45. "Child had been visiting at Flint and it is supposed that she contracted the disease there."—*E. E. Curtis, M. D., Saginaw city, W. S., Saginaw county.*

46. "Supposed to be imported from Jackson county, Mich., by visitors from that county."—*R. C. Traver, M. D., Somerset township, Hillsdale county.*

47. "Supposed from Muskegon or where they were visiting."—*H. A. Shurtleff, M. D., Lee township, Calhoun county.*

48. "The disease existed near by in the adjoining township [Bridgehampton]; and probably came from there."—*G. C. Vincent, M. D., Marion township, Sanilac county.*

49. "Probably from Chelsea, Washtenaw county."—*Sam'l DuBois, M. D., Unadilla township, Livingston county.*

50. "Seemed to be imported from Detroit."—*Wm. E. Sitzer, M. D., Ida township, Monroe county.*

51. "A letter received from a friend in lower Michigan where measles was present is only probable source."—*F. McD. Harkins, M. D., Marquette city, Marquette county.*

52. "The first case was taken sick on her arrival in this town from Alabama."—*A. H. Barden, health officer, Rapid River township, Kalkaska county.*

53. [Supposed source] "A small child first taken down after being in Chicago with its parents."—*C. L. Bunker, health officer, Royalton township, Berrien county.*

53. "Supposed to have taken the disease in Chicago,"—*Hiram B. Wilcox, M. D., Three Oaks village, Berrien county.*

54. "Unknown—A lady came from Denver, Colo., and was taken sick a week later."—*T. C. Buskirk, M. D., White Pigeon village, St. Joseph county.*

55. [Supposed source] "A student at school here had been home visiting in Ohio, about one week after having returned, he came down with measles."—*E. Emerson, M. D., Spring Arbor township, Jackson county.*

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* Third locality infected from the second.

NEGLECT OF MEASURES TO RESTRICT MEASLES, VIOLATIONS OF PUBLIC-HEALTH LAWS, ETC.—RESULTS.

Neglected Outbreak of Measles in the City of Holland.

An outbreak of measles occurred in the city of Holland in which the health officer states there were about 200 cases; no effort was made to restrict the disease, as is shown by statements from the health officer's final report, which are substantially as follows:—

I do not know positively the source of contagium. Many cases of measles are not attended by a physician, and are not reported to the clerk. I do not know when the first case was taken sick; new ones are reported every day. Patients were not isolated and many were infected at school. No sulphur was burned, and other methods of disinfection were neglected. Very little was done to isolate, as the town was full of it; may have had 200 cases in the last two months.

The reason for this neglect was probably lack of appreciation of the duties of a health officer by the city authorities; he says, "I was elected health officer last year, but never qualified, as the council cut the salary. I did what little had to be done, as the council of the city took no interest in the matter of health. I felt that the matter rested with them and not with me."

Neglected Outbreak of Measles in Deerfield Township, Lapeer County.

An outbreak of measles occurred in Deerfield township, Lapeer county, in which there were 40 cases of the disease. The health officer, Erwin Dockham, wrote to the Secretary of this Board, July 1, 1895, relative to the way in which restrictive measures were ignored, as follows:—

"It is impossible for me to make any report in regard to the measles. I have done the same as the adjoining townships have done, also the city of Lapeer—let them go. We have had about twelve families with the measles, probably thirty patients. No deaths. I have talked with several of the families in regard to disinfecting their houses, and they all say they have used sulphur, but how much I do not know. Hoping all will be right, I am yours, etc."

The Secretary of this Board wrote July 5, 1895, in answer to the above-quoted letter, as follows:—

"Your letter of July 1, relative to measles, is before me, for which please accept thanks.

"Measles is a 'disease dangerous to the public health,' and as such the necessary precautions should be taken to prevent its spread, and Act 137, laws of 1883, makes it the duty of the health officer, whenever he 'shall receive reliable notice,' or 'have good reason to believe that there is within' his jurisdiction any dangerous communicable disease, unless he shall have been otherwise ordered by his local board of health to immediately investigate the subject, and 'to order the prompt and thorough isolation of those sick or infected,' etc. Herewith I enclose a marked pamphlet bearing upon that subject, and I trust that hereafter you will use every effort to stamp out any outbreaks of any dangerous communicable disease which may occur in your jurisdiction."

Neglected Outbreak of Measles in Chelsea Village, Washtenaw County.

Geo. W. Palmer, M. D., health officer of the village of Chelsea, in reporting relative to an outbreak of measles in his jurisdiction and in the adjoining township of Sylvan, stated as follows, relative to the commencement of the outbreak and the subsequent neglect of restrictive measures:—

"There were two cases of measles found in Chelsea this morning and two in the township of Sylvan, and one that occurred ten days ago in the township, that was not reported to me nor any member of the Board, by the family, or the doctor who attended the case."

The outbreak began in April, and lasted until August, 1895. There were 100 cases with one death, and 37 households were infected. In speaking of the number of cases that were isolated from all persons except the nurse and physician, the health officer said, "Very few were isolated completely and long enough." The disinfection was not thorough. He stated that he "Had some trouble to make people follow rules and requirements."

MODES OF CONVEYING THE CONTAGIUM OF MEASLES.

The following quotations from reports of health officers show some alleged sources of measles contagium:—

"Conveyed through the mails"—*H. J. Kine, M. D., Crystal Lake township, Benzie county.*

"Not certain but think from the paper mill."—*W. L. Garratt, M. D., Watervliet village, Berrien county.*

"By clothing worn by a relative coming to their house from an infected family of Coldwater township." —*G. A. McMaster, M. D., Batavia township, Branch county.*

"Miss F——, (teacher) was taken sick in school and the pupils are all exposed."—*Eugene D. Millis, M. D., LeRoy township, Ingham county.*

"A letter received from a friend in lower Michigan where measles was present is the only traceable source."—*F. McD. Harkins, M. D., Marquette city, Marquette county.*

"A teamster had been transferring supplies to afflicted district and probably carried infection on clothes."—*C. W. Logan, M. D., Marquette township, Mackinac county.*

"Probably exposed during trip from England, either on ship or cars."—*Geo. G. Barnett, M. D., Ishpeming city, Marquette county.*

THE CONTAGIUM OF MEASLES CARRIED BY HEALTHY PERSONS.

Frank W. Garber, M. D., member of the board of education of the city of Muskegon, wrote to the Secretary of this Board, Nov. 12, 1895, relative to the possibility of measles contagium being carried by children who did not themselves have the disease. Doctor Garber's letter was as follows:—

"In your opinion would there not be danger of contagium in a child who has himself had measles, but who lives in a family where cases of that disease exist? To be definite, our health officer has given a certificate to a child under such circumstances, declaring the child to be incapable of conveying the disease. The board of education's belief is that there is danger from such a source, and refuse to recognize the certificate. I am personally of the belief that it would be an unwise proceeding to admit a pupil under such circumstances, and think I have proof that cases have arisen here from a failure to exclude such pupils as I have described. Kindly let me know your views. Can you refer me to any literature on the subject?

In reply to the above-quoted letter the Secretary of this Board wrote Nov. 13, 1895, as follows:—

"Your letter of Nov. 12, was received this morning. In reply to your question, whether there would be danger of contagium of measles being carried into the school by 'a child who has himself had the disease, but who lives in a family where cases of that disease exist.' Authorities seem to agree that the disease *is* so carried, by persons who are themselves not affected by the disease, but whose clothes probably convey the infection. Below are given citations, on this point:—

"'The danger of contagium is proportionate to the propinquity of the contaminating influence, being greatest in the sick-room. It cannot be denied that measles may be spread by mediate contagion. In such cases the clothing probably becomes the disseminating agent. Such articles as have been used by the patient, the bed-linen, even those things that have been used in the sick room, very frequently communicate the disease.'—(Atkinson,—A. H. Buck's 'Reference Handbook of the Medical Sciences.' Wm. Wood & Co., Vol. I., p. 682.)

"'Every object which has in anyway come into contact with infected persons, or has been in their atmosphere, may serve as a vehicle of contagium. Even a healthy physician can, by means of his clothes, or of any other thing he carries with him, occasion infection, as in several instructive cases mentioned by Panum. * * * Thuessink assures us that he knew of a case where the infection was occasioned by a letter; and another where it was attributed to an engraving sent per post. How long the contagion in the clothes and other objects remains active, is not known; its tenacity appears, however, to be but moderate.'—(Ziemssen, 'Cyclopedia of the Practice of Medicine,' Vol. II., p. 41.)

"'It is also proved by the fact that children's clothing sent home in boxes from schools where the disease has raged, communicate the disease and also by the same circumstances resulting when susceptible children have lain in the same beds, or in the same room, shortly after it has been occupied by patients suffering from the disease.'—(Aitken's 'Science and Practice of Medicine.' Vol. I., p. 431.)

"From the experience of physicians and health officers in this State and with such authority as is cited above, it would seem best to exclude from the schools or public gatherings, persons who may convey the infection of measles to susceptible persons."

POSSIBLE VITALITY OF MEASLES CONTAGIUM.

An outbreak of measles occurred in the township of Maple Ridge, Alpena county, which began in June and lasted until November, 1895. Jas. S. Shelley, the health officer, in his final report of the outbreak stated relative to the source of contagium, as follows:—"The boy had been at Alpena on a message and perhaps was infected while there; his sister then took it from him and the others from them when at school." In answer to the question, "What other facts bear upon the subject of the period of incubation?" He said, "The first two who were sick in June and were not disinfected perhaps infected the others four months after they [the first] had recovered."

RELATIVE TO DEFRAYING EXPENSES INCURRED IN ATTENDING INDIGENT PERSONS SICK WITH MEASLES.

N. McClinton, M. D., health officer of Cass City, wrote to the Secretary of this Board, Nov. 4, 1895, asking whether the county can be compelled to pay bills incurred in caring for indigent persons sick with measles; his letter was as follows:—

"Last winter when measles was here I made enquiry, what I was to do, from the local board. When I was told that I was to comply with the law. I placarded and attended the sick; provided what necessaries were required, as they were indigents. And now we are told that we cannot collect for attending measles. What am I to do to get compensation for my attendance and medicine?

"I would not trouble you were it not that the judges do not seem to give the same opinion on the matter. By giving me the required information you will greatly oblige."

The Secretary of this Board answered the above-quoted letter, as follows:—

"Section 1647 Howell's Statutes provides that when any person coming from abroad or residing in any township within this State shall be infected with any sickness dangerous to the public health, the board of health shall make effectual provision in the manner in which they judge best for the safety of the inhabitants, by providing nurses and other assistance and necessaries, which shall be at the charge of the person himself, his parents or other persons who may be liable for his support, *if able:* otherwise as a charge to the county to which he belongs. Provided, that the Board of Health shall keep and render an itemized and separate statement of expenses incurred in so caring for each person.

"From your letter I infer that your Board has done so, as you say the bills have been audited, certified to and ordered paid by the local board of health.

"A supreme court decision—3rd. Mich., p. 475—is to the effect that 'When any expenses incurred under the above-mentioned section are chargeable to the county, and the amount due has been ascertained, and fixed by the board of health, it is the duty of the board of supervisors to allow at once that amount, and to provide for its payment. They have no discretion in the matter further than to ascertain whether the patient, or those who may be liable for his support, are able to pay the expenses incurred under this section.' I herewith enclose a marked copy of a pamphlet bearing upon this subject.

"If the Board of Supervisors have refused to pay the bills it will probably be necessary for your local board of health to commence a suit to recover the expenses incurred, but I do not understand that you are required to do so. The local board of health is first liable and immediately responsible and should see that you are properly paid for your services. The enclosed pamphlet also bears upon that subject. See page 3, on which I have marked paragraph from decision of supreme court of Michigan—51st. Mich., p. 527, that 'City is immediately responsible.' I suppose the same principle applies to the Village."

OUTBREAKS IN WHICH ISOLATION AND DISINFECTION WERE ENFORCED.—RESULTS.

The following is the substance of a few representative statements of health officers whose reports indicated that they had quite fully enforced isolation in outbreaks of measles:—

Outbreaks of Measles in the City of Saginaw, W. S.

Two outbreaks of measles occurred in the city of Saginaw, W. S., during the year 1895, each outbreak was restricted to the first case. E. E. Curtis, M. D., health officer of the city, in his final report of the first outbreak, stated substantially as follows:—

The source of contagium was a child who had been visiting at Flint, and it is supposed that she contracted the disease there or *en route*. The patient was kept isolated from all people except nurse and physician. Sulphur was burned and other means used for disinfecting rooms, clothing, bedding, etc.

In the second outbreak—the source of contagium was unknown; the case was isolated. Disinfection was thoroughly carried out.

The efficiency of restrictive measures is shown in these two instances where the disease was confined to the single cases.

Outbreak of Measles in the Village of Nashville, Barry County.

An outbreak of measles occurred in the village of Nashville, Barry county, which with care in the observance of restrictive measures was confined to the one case. The health officer, W. H. Young, M. D., stated in his final report of the outbreak substantially as follows:—

The source of contagium was from visiting a brother sick with the disease at Deckerville, Mich. The patient was kept isolated from all persons except the nurse and physician. Rooms were disinfected by burning sulphur. Discharges were disinfected by using chlorinated lime and burying them.

Outbreak of Measles in the Village of Bronson, Branch County.

An outbreak of measles occurred in the village of Bronson, Branch county. Jno. E. Outwater, M. D., health officer of the village, in his final report of the outbreak stated substantially as follows relative to the methods for restriction which were employed:

The house was placarded. The patient was kept isolated from all except nurses, family and physician. Rooms, clothing and bedding were disinfected by burning sulphur. Discharges were buried or thrown into privy vault. The disease was restricted to the single case.

ESTIMATED NUMBER OF OUTBREAKS AND CASES OF MEASLES PREVENTED AND LIVES SAVED BY ISOLATION AND DISINFECTION.

Tables 9 and 10 and the following diagram compare the average numbers of cases and deaths in outbreaks of measles where the measures of isolation and disinfection, prescribed by the Michigan State Board of Health, were enforced, with the average numbers of cases and deaths in those outbreaks where these measures were neglected.* By table 10 it may be seen that during the six years, 1890–95, there were about 22 times as many cases per outbreak in those outbreaks in which these measures were neglected as in those outbreaks in which they were enforced; and that while there were four-tenths of one death per outbreak where restrictive measures were neglected, no deaths occurred where those measures were enforced.

By table 9 it may be seen that during the year 1895 there were reported to the office of the State Board of Health 269 outbreaks of measles with 4,462 cases and 13 deaths. Had no efforts at restriction been made, and had the average numbers of cases and deaths per outbreak remained the same as in the column headed "Isolation and Disinfection both Neglected," there would have occurred 7,505 cases, and taking from these the cases (4,462) which did occur, leaves 3,043 cases indicated as prevented in these 269 outbreaks, by isolation and disinfection. By the same method for each year the indicated saving in the 2,031 outbreaks which occurred during the six years, 1890–95, is 74,167 cases and 566 lives. This is shown in Table 10.

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* *Definition of Outbreak.*—For studying the influence of isolation and disinfection in restricting outbreaks of communicable diseases, an outbreak is considered as, the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village, or township. All cases of the disease occuring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of over 60 days has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak is considered as ended,—unless new cases occur the contagium of which can be traced back to the preceding cases, in which instance the latter cases are considered as part of the same outbreak.

In the compilation of the reports for Tables 9 and 10 and the diagram showing the results obtained by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the number of cases and deaths were placed in the column headed "Isolation and Disinfection both Neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed, "Isolation and Disinfection Enforced." If, however, he neglects to properly isolate or disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this Office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed "Isolation or Disinfection or both not mentioned, or statements doubtful."

TABLE 9.—*Measles in Michigan in 1895; Exhibiting the Average Numbers of Cases and Deaths per Outbreak:—(1) In all the 269 outbreaks reported; (2) in the 152 outbreaks in which it is doubtful whether or not Disinfection or Isolation was enforced; (3) in the 0 outbreaks in which Disinfection was enforced and Isolation was doubtful; (4) in the 14 outbreaks in which Isolation was enforced and Disinfection was doubtful; (5) in the 13 outbreaks in which Isolation was enforced and Disinfection was neglected; (6) in the 7 outbreaks in which Disinfection was enforced and Isolation was neglected; (7) in the 56 outbreaks in which both Isolation and Disinfection were neglected; (8) in the 25 outbreaks in which both Isolation and Disinfection were enforced.*

	(1) All outbreaks. (269 outbreaks.*)		(2) Isolation or Disinfection or both not mentioned, or statements doubtful. (152 outbreaks.)		(3) Disinfection enforced —Isolation doubtful. (0 outbreak.)		(4) Isolation enforced—Disinfection doubtful. (14 outbreaks.)		(5) Isolation enforced—Disinfection neglected. (13 outbreaks.)		(6) Disinfection enforced —Isolation neglected. (7 outbreaks)		(7) Isolation and Disinfection neglected. (56 outbreaks.)		(8) Isolation and Disinfection enforced. (25 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals....	4,462	13	2,660	7	0	0	37	0	62	0	68	0	1,563	6	72	0
Averages..	16.6	.05	17.5	.05	0	0	2.6	0	4.8	0	9.7	0	27.9	.1	2.9	0

* A definition of the term "outbreak," and facts relative to methods of compilation of outbreaks, are printed in foot-note on the preceding page of this Report.

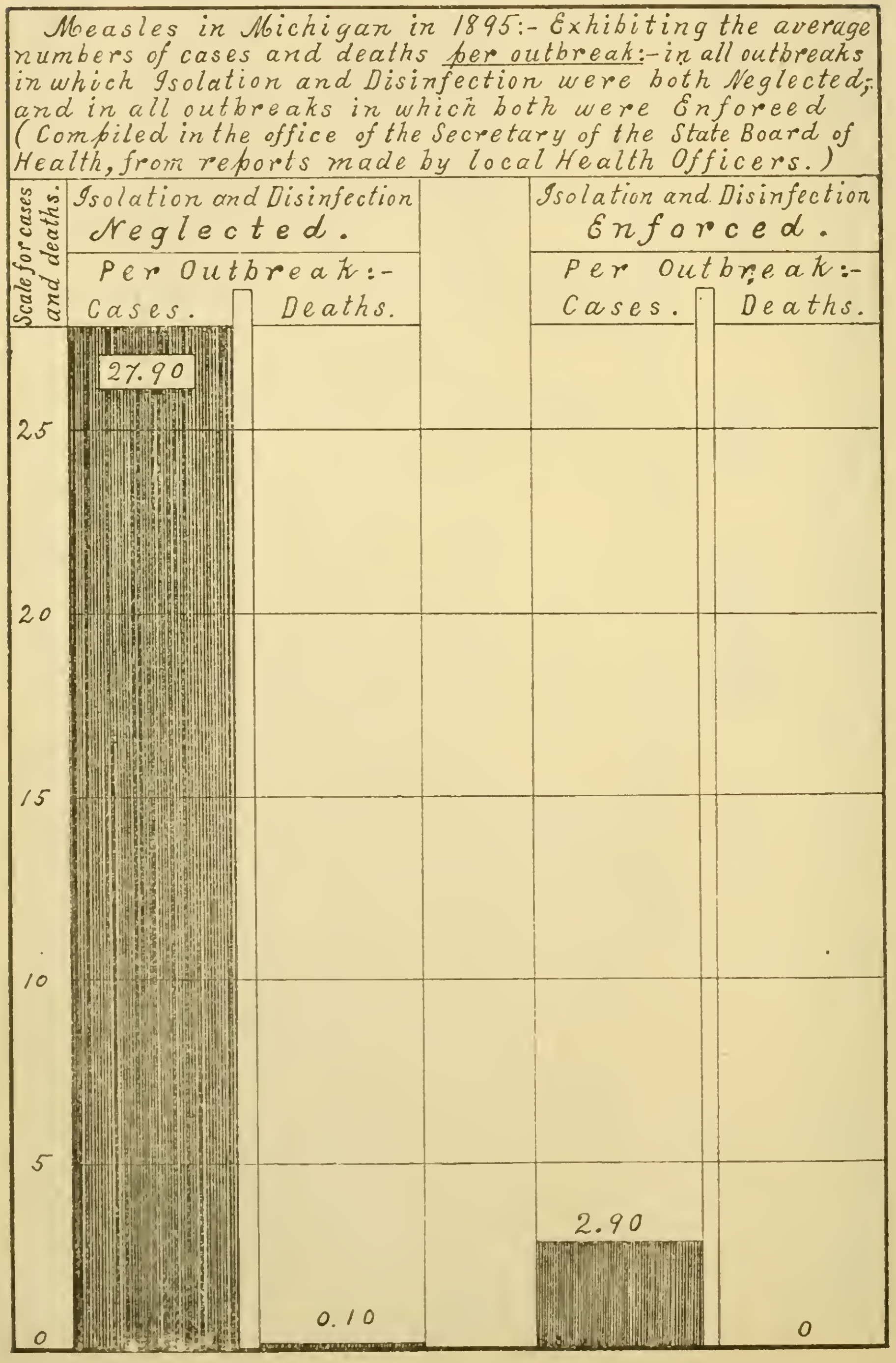
TABLE 10.—*Exhibiting for the six years, and for each of the six years, 1890–95, the numbers of Reported Outbreaks, Cases and Deaths; also for this six-year Period, the average numbers of Cases and Deaths per Outbreak in all outbreaks; in those Outbreaks in which Isolation or Disinfection or both were Doubtful; Isolation and Disinfection both Neglected; Isolation and Disinfection both Enforced; and, also, the Numbers of Cases and Deaths Indicated as having been prevented by Isolation and Disinfection.*

Years.	All Outbreaks.*			Isolation or Disinfection, or both, not Mentioned, or Statements Doubtful.			Isolation *and* Disinfection Neglected.			Isolation and Disinfection Enforced.			Cases and Deaths Indicated as having been Prevented by Isolation and Disinfection.†	
	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Outbreaks.	Cases.	Deaths.	Cases.	Deaths.
1890	419	11,189	103	353	6,326	59	57	4,819	44	6	19	0	24,233	220
1891	392	12,338	118	309	6,492	59	71	5,920	63	11	27	0	20,347	231
1892	236	4,406	67	187	2,427	45	31	1,953	22	7	8	0	10,462	101
1893	357	5,440	71	238	2,569	53	70	2,681	14	10	24	0	8,233	0
1894	358	7,345	49	246	4,190	42	70	2,971	7	13	32	0	7,849	0
1895	269	4,462	13	152	2,660	7	56	1,563	6	25	72	0	3,043	14
Totals for the six years, 1890-5	2,031	45,180	421	1,485	24,664	265	355	19,907	156	72	182	0	74,167	566
Annual averages for the six years, 1890-5	339	7,530	70	248	4,111	44	59	3,318	26	12	30	0	12,361	94
Average cases and deaths per outbreak, 1890-5	....	22.2	.2	....	16.6	.2	....	56.1	.4	....	2.5	0	....	....

* For the years 1890-93 inclusive, outbreaks in Detroit and Grand Rapids are not included. For the year 1894 the outbreak in Grand Rapids is not included, because of the difficulty of determining the beginning and ending of the outbreak. The outbreak in that city in the year 1894 was a continuation of an outbreak in 1893 and extended into the year 1895.

† The numbers of cases and deaths in this double column are found by multiplying "all outbreaks" for each year by the average number of cases or deaths per outbreak, in those outbreaks in which isolation and disinfection were both neglected, for that year, and deducting from the results thus obtained, the cases or deaths, as the case may be, which were *reported* to have occurred that year, to learn the numbers that would have occurred if efforts for the restriction of the disease had not been made. The instances in which isolation and disinfection were enforced are still so few that the evidence is not yet very satisfactory.

Isolation and Disinfection Restrict Measles.



Measles in Michigan in 1895:- Exhibiting the average numbers of cases and deaths *per outbreak*:- in all outbreaks in which Isolation and Disinfection were both Neglected; and in all outbreaks in which both were Enforced (Compiled in the office of the Secretary of the State Board of Health, from reports made by local Health Officers.)

[PLATE 881]

PERIOD OF INCUBATION IN MEASLES.

TABLE 11.—*Exhibiting the reported period of Incubation, stated in days, in 168 instances of Measles. Compiled from reports of Health Officers in Michigan, for the year 1895.*

Incubation period—days	3	5	6	7	8	9	10	11	12	14	15	16	21
Cases in each period	1	*2	2	†6	2	‡3	§17	1	¶2	‖126	3	2	**1

* In 2 instances it was reported as *about* 5 days.
† In 4 instances it was reported as *about* 7 days.
‡ In 1 instance it was reported as *about* 9 days.
§ In 12 instances it was reported as *about* 10 days.
¶ In 1 instance it was reported as *about* 12 days.
‖ In 80 instances it was reported as *about* 14 days.
** In 1 instance it was reported as *about* 21 days.

The average of the above 168 reported periods of incubation is about 13 days.

TABLE 12.—*Exhibiting, relative to 58 instances of Measles in Michigan in 1895, the Reported Period of Incubation, within certain limits, stated in days; also the Means, the Average of which may Represent the Average Period of Incubation.*

Days.	Means.	Days.	Means.	Days.	Means.	Days.	Means.
4 to 8	6	7 to 30	18.5	7 to 30	18.5	9 to 15	12
4 to 10	7	7 to 30	18.5	7 to 30	18.5	9 to 21	15
5 to 7	6	7 to 30	18.5	7 to 30	18.5	9 to 21	15
6 to 21	13.5	7 to 30	18.5	7 to 30	18.5	10 to 12	11
7 to 10	8.5	7 to 30	18.5	7 to 30	18.5	10 to 12	11
7 to 10	8.5	7 to 30	18.5	7 to 30	18.5	10 to 14	12
7 to 14	10.5	7 to 30	18.5	8 to 9	8.5	10 to 14	12
7 to 21	14	7 to 30	18.5	8 to 10	9.0	10 to 14	12
7 to 21	14	7 to 30	18.5	9 to 10	9.5	10 to 14	12
7 to 21	14	7 to 30	18.5	9 to 14	11.5	10 to 21	15.5
7 to 21	14	7 to 30	18.5	9 to 14	11.5	12 to 20	16
7 to 21	14	7 to 30	18.5	9 to 14	11.5	12 to 20	16
7 to 21	14	7 to 30	18.5	9 to 14	11.5	14 to 21	17.5
7 to 21	14	7 to 30	18.5	9 to 14	11.5		
7 to 21	14	7 to 30	18.5	9 to 14	11.5		

The average of all the means, for the 58 instances is 14.4 days.

AGES OF GREATEST PREVALENCE OF, AND MORTALITY FROM MEASLES.*

The reports of local health officers in Michigan, for the year 1895, stated the ages of 1,172 persons who were sick with measles, and of 5 persons who died of that disease. Table 13 represents, in certain age-groups, the numbers of cases and of deaths from measles; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of the cases in that group; the per cent that the deaths in each group were of all deaths; and the per cent that the deaths in special groups were of all deaths,—compiled from all reports for the year 1895, which stated the ages.

By Table 13 it may be seen that the greatest proportion of cases of measles was of children under 10 years of age, 59.6 per cent of all cases having occurred in that age-period; that 32.8 per cent of cases were of persons from 10 to 25 years of age; and 7.6 per cent were of persons over 25 years of age.

TABLE 13.—*Exhibiting in certain Age-groups, the number of cases and the number of deaths from Measles; the per cent that the cases in each group were of all cases of known ages; the per cent that the deaths in each group were of all deaths at known ages; and the per cent that the deaths in each group were of the cases in that group.—Compiled from all reports for the year 1895 which stated the ages.*

	Number and per cent of Cases and Deaths in certain Age-groups.†																		
Ages in groups of years.	All ages known.	Under 1.	1.	2.	3.	4.	Under 5.	5-9.	10-14.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50-54.	55-59.	Over 60.
No. of cases	‡1,172	19	45	46	57	62	229	470	215	109	61	37	19	14	6	6	3	3	0
Per cent the cases in each group were of all cases of known ages	100	1.6	3.8	3.9	4.9	5.3	19.5	40.1	18.3	9.3	5.2	3.2	1.6	1.2	.5	.5	.3	.3	0
No. of deaths	‡5	1	0	0	1	1	3	0	2	0	0	0	0	0	0	0	0	0	0
Per cent the deaths in each group were of cases in that group	.43	5.3	0	0	1.8	1.6	1.3	0	.9	0	0	0	0	0	0	0	0	0	0
Per cent the deaths in each group were of all deaths at known ages.	100	20	0	0	20	20	60	0	40	0	0	0	0	0	0	0	0	0	0
Per cent the deaths in special groups were of all deaths at known ages	--------	60					60		40				0						

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*In compiling data relative to ages, used in tables in this article each age-period begins and ends on the birthday. For arranging the ages by single years or in age-periods the following method is pursued:—From birth to one year old is the *first* year. Those one year old and less than two years old are classed in the second year. The third year of age includes all persons over two years and less than three years of age, and so on for each succeeding year.

In dividing the ages into five-year periods, the first period includes all ages from birth to five years, or all *under* five years of age. The second five-year period includes all ages of five years and over and less than ten years. In each succeeding period the same arrangement is followed.

† For the method of compiling ages see foot-note on page 264.

‡ Does not include those cases or deaths where the age was not stated.

In 1895 the greatest proportion of deaths from measles was reported to have occurred in children under 5 years of age, 60 per cent of all deaths having occurred in that age-period; the balance (40 per cent) of deaths occurred in the age-period from 10–14 years.

Table 14 exhibits the numbers of cases and deaths, in which the ages were stated; the per cent the cases in each age-group were of all cases, and the per cent the deaths in each age-group were of all deaths in the four years and in each of the four years, 1892–5.

There are two erroneous and very harmful beliefs, quite prevalent among parents,—that measles cannot ultimately be escaped any more than teething, and that the least dangerous time for persons to have the disease is while quite young children. Whatever ground there may be for these beliefs elsewhere, Table 9 and the diagram illustrative of it, and Tables 13 and 14 of this article show that none exists in Michigan; but that on the contrary, facts here bear evidence that measles is a preventable disease; and that it is *more* fatal to young children than to persons in the middle ages.

TABLE 14.—*Exhibiting in certain Age-Groups, the number of Cases and the number of Deaths from Measles in the four years and in each of the four years 1892–95; the per cent that the Cases in each group were of All Cases; the per cent that the Deaths in each group were of all Deaths.—Compiled from all reports for the years 1892–95, which stated the ages.*

Year.		Total No. included.	Per Cent of Cases and Deaths in certain Age-groups.*													
			All Ages.	0 to 4.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 to 54.	55 to 59.	60 years and over.
1892.	Cases	786	100	28.5	30.0	18.6	12.7	3.9	2.9	1.7	1.0	0.3	0.1	0	0.1	0.1
	Deaths	34	100	41.2	44.1	5.9	0	2.9	2.9	0	0	0	0	0	2.9	0
1893.	Cases	3,064	100	32.5	35.1	12.0	9.3	4.5	3.0	2.1	0.9	0.6	0.2	0.2	0.07	0.07
	Deaths	22	100	41.0	13.6	9.1	4.5	4.5	9.1	9.1	0	4.5	0	0	0	4.5
1894.	Cases	4,807	100	33.7	41.4	12.8	5.5	3.0	1.6	1.0	.6	.3	.3	.02	0	.04
	Deaths	20	100	45.0	20.0	5.0	10 0	10.0	10.0	0	0	0	0	0	0	0
1895.	Cases	1,172	100	19.5	40.1	18.3	9.3	5.2	3.2	1.6	1.2	.5	.5	.3	.3	0
	Deaths	5	100	60.0	0	40.0	0	0	0	0	0	0	0	0	0	0
1892–5.	Cases	9,829	100	31.2	38.4	13.5	7.7	3.8	2.3	1.5	.8	.4	.3	.1	.06	.05
	Deaths	81	100	43.2	27.2	8.6	3.7	4.9	6.2	2.5	0	1.2	0	0	.12	1.2

* For method of compiling ages in the years 1892, '93 and '94 see foot-note on page 363 of the Annual Report of this Board for 1895. For the method of compiling ages in the year 1895 see foot-note on page 264 of this Report.

On page 342 of the Annual Report of this Board for the year 1894 is given a diagram which graphically represents the figures in a table similar to Table 14; showing for the two years, 1892–93, the per cent of deaths which occurred in each age-period.

TABLE 15.—*Exhibiting, by Sex, the per cent of persons in certain Age-groups who recovered from Measles, in Michigan, during the years, 1893–95; also the average age and number of cases included.* (*Compiled from such reports as stated the ages.*)

Year.	Sex.	Average age of persons who recovered. Years.	No. of cases included.	Age.—In Periods of Years. Per cent of (non-fatal) Cases in each Period.*													
				All Ages.	Under 5 years.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 to 54.	55 to 59.	60 years and over.
1893.	Males	10.28	1,446	100	31.3	37.2	10.3	8.4	5.7	3.3	2.1	1.0	.5	.1	.07	0	.07
	Females	10.22	1,596	100	33.5	33.6	12.5	10.2	3.4	2.8	2.1	.9	.6	.2	.3	.1	.06
1894.	Males	8.49	2,424	100	33.9	43.2	12.1	4.8	2.9	1.3	.7	.5	.3	.3	0	0	0
	Females	9.04	2,363	100	33.4	39.7	13.5	6.1	3.0	1.7	1.3	.7	.3	.3	.04	0	.08
1895.	Males	9.90	579	100	21.6	41.6	18.7	6.6	5.2	2.4	1.9	.7	.7	.5	.2	0	0
	Females	11.20	588	100	17.2	38.9	17.9	12.1	5.3	3.9	1.4	1.7	.3	.5	.3	.5	0
1893–5.	Males	9.56	4,449	100	31.5	41.0	12.3	6.2	4.1	2.1	1.3	.7	.4	.3	.04	0	.02
	Females	10.51	4,547	100	31.3	37.5	13.7	8.3	3.4	2.4	1.6	.9	.4	.3	.2	.1	.04

* On a preceding page, a foot-note to the sub-head under which this table appears, explains these age-group.

Table 15 shows that of the 4,449 males reported to have recovered from measles in the years, 1893–95 of which the ages were stated, 41 per cent occurred in the age-period from 5 to 9 years, and 31.5 per cent occurred in children of under 5 years, 12.3 per cent occurred in the period from 10 to 14 years and from this age-period the per cent greatly decreased.

TABLE 16.—*Exhibiting, by Sex, the per cent of persons in certain Age-groups who died of Measles during the years, 1893-5.*

Year.	Sex.	Average age of decedents. Years.	No. of cases included.	Per Cent of Deaths in certain Age-groups.*										
				All Ages.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 Years and over.
1893.	Males	11.2	10	100	60	10	0	10	0	10	0	0	10	0
	Females	19.2	12	100	25	16.7	16.7	0	8.3	8.3	16.7	0	0	8.3
1894.	Males	10.4	11	100	36	18	9	18	18	0	0	0	0	0
	Females	9.7	9	100	56	22	0	0	0	22	0	0	0	0
1895.	Males	8.5	2	100	50	0	50	0	0	0	0	0	0	0
	Females	5.2	3	100	66	0	33	0	0	0	0	0	0	0
1893-5.	Males	10.2	23	100	47.8	13.0	8.7	13.0	8.7	4.3	0	0	4.3	0
	Females	11.5	24	100	41.7	16.7	12.5	0	4.2	12.5	8.3	0	0	4.2

*On a preceding page, a foot-note to the sub-head under which this table appears, explains these age-groups.

Death-rates at the Different Ages.

EXHIBIT—*By sex and in age-groups, the reported number of deaths from measles per 100,000 persons living in Michigan during the 25 years, 1870-94.* (*Compiled from the Secretary of State's Vital Statistics of Michigan.*)

Sex.	Deaths from Measles per 100,000 population.					
	All ages.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 and over.
Males	8.0	49.7	7.8	2.1	3.5	1.0
Females	9.3	50.5	9.0	3.3	3.5	1.8
Both Sexes	8.6	50.1	8.2	2.6	3.5	1.5

TABLE 17.—*Exhibiting, by Sex, for each year of Age, and in certain Age-groups, the number of persons who died from Measles during the four years 1892–5, and the per cent the deaths in each Age-group were of deaths at all ages. (Compiled from such reports to the State Board of Health, as stated the sex and age.)*

Sex.	Ages in Years, and groups of Years.	All Ages.	Number and per cent of Deaths by Sex, in certain Age-periods.*																													
			1–5.					6–10.					11–15.					16–20.					21–30.									31+
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	24	25	26	27	28	29	30	31 and over.
Males.	No. of Deaths, by single Years	----	6	3	2	5	1	4	2	3	--	3	--	1	--	--	1	1	--	1	1	..	1	--	1	1	--	1	1	--	--	1
	No. of Deaths, by Groups of Years	40	17					12					2					3					5									1
	Per cent the Deaths in each age-group were of the total deaths † among Males	100	42.5					30.0					5.0					7.5					12.5									2.5
	Average age at Death, from Measles	9.6																														
Females.	No. of Deaths, by single Years	----	8	4	2	2	2	1	1	3	2	3	--	3	--	1	1	--	--	--	--	--	--	1	--	--	1	--	--	1	1	4
	No. of Deaths, by Groups of Years	41	18					10					5					0					4									4
	Per cent the Deaths in each age-group were of the total deaths † among Females	100	43.9					24.4					12.2					0					9.8									9.8
	Average age at Death, from Measles	12.0																														
Both Sexes.	No. of Deaths, by single Years	----	14	7	4	7	3	5	3	6	2	6	--	4	--	1	2	1	--	1	1	..	1	1	1	1	1	1	1	1	1	5
	No. of Deaths, by Groups of Years	81	35					22					7					3					9									5
	Per cent the Deaths in each age-group were of the total deaths † in both sexes	100	43.2					27.2					8.6					3.7					11.1									6.2
	Average age at Death, from Measles	10.8																														

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* On a preceding page, a foot-note to the sub head under which this table appears, explains these age-groups.

† Deaths from measles.

Case-Mortality Rates from Measles at the Different Ages.

EXHIBIT—*In certain age-groups, the numbers of cases and deaths from measles in the six years, 1890–95, and the per cent that the deaths in each group were of the cases in that group. (Compiled from all reports to the Secretary of the State Board of Health for the years, 1890–95 which stated the ages.)*

	Under 1.	Under 5.	5 to 9.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 to 54.	55 to 59.	60 to 64.	65 to 69.
Cases—1890–95	151	3,566	5,981	2,586	1,333	736	353	258	163	83	50	12	7	8	3
Deaths—1890–95	9	56	27	14	10	6	5	4	2	2	1	0	0	2	1
Per cent	6.0	1.6	0.5	0.5	0.7	0.8	1.4	1.6	1.2	2.4	2.0	0	0	25.	33.

AVERAGE DURATION OF MEASLES.—FATAL AND NON-FATAL CASES.

TABLE 18.—*Exhibiting, by sex of patient, the duration (in days) of fatal cases of sickness from Measles, in Michigan, during the years 1893–95. Arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of Measles.									
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per cent of Deaths in each Period of Days.						
			All cases.	1 to 5.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.
1893.	Males	9	100	44.4	22.2	22.2	11.1	0	0
	Females	11	100	9.1	27.2	27.2	18.1	9.1	9.1
1894.	Males	9	100	33.3	33.3	11.1	11.1	11.1	0
	Females	6	100	33.3	33.3	16.6	16.6	0	0
1895.	Males	1	100	0	0	0	0	0	100.
	Females	3	100	0	33.3	33.3	33.3	0	0
1893–5.	Males	19	100	36.8	26.3	15.8	10.5	5.3	5.3
	Females	20	100	15.0	30.0	25.0	20.0	5.0	5.0

Table 18 shows that of the 19 males reported to have died from measles in the three years, 1893–5, of which the interval between the day of being taken sick and the day of death was given, 36.8 per cent died before the sixth day of sickness, and the per cent of deaths decreased in the succeeding five-day periods. Of the 20 females so reported the largest per cent (30.0) died in the second five-day period.

The average duration of fatal cases of measles in the years, 1893–5, was 9.8 days for males and 12.4 days for females.

TABLE 19.—*Exhibiting by Sex of patient, by per cent of cases which recovered in specified periods of time, the Duration (in days) of Non-Fatal cases of sickness from Measles, in Michigan, during the years 1893-95. Arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Non-Fatal Cases of Measles.															
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per Cent of Cases in each Period of Days.												
			All Periods.	1 to 5 days.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	51 to 55.	56 days and over.
1893.	Males	620	100	12.1	45.0	25.3	9.7	3.5	1.6	1.0	1.0	.2	.2	.3	.3
	Females	654	100	13.9	49.7	22.2	7.5	2.8	1.9	.2	.9	.3	.5	0	.2
1894.	Males	823	100	5.0	46.8	23.6	17.4	4.9	.6	.4	.4	.2	.2	.2	.4
	Females	771	100	7.1	45.4	24.9	16.6	4.4	.3	.7	0	.1	.5	0	0
1895.	Males	338	100	9.8	49.4	26.3	7.4	3.3	.9	.3	1.8	.6	.3	0	0
	Females	321	100	8.7	51.4	26.8	6.5	4.4	.9	.3	.6	.3	0	0	0
1893-95.	Males	1,781	100	8.4	46.7	24.7	12.8	4.1	1.0	.6	.8	.3	.2	.2	.2
	Females	1,746	100	10.0	48.1	24.2	11.3	3.8	1.0	.4	.5	.2	.4	0	.1

Table 19 shows that of the 1,781 males who recovered from measles during the three years 1893–5, of which the interval between the day of being taken sick and the day of recovery was stated, 55.1 per cent recovered before the eleventh day of sickness, 79.8 per cent recovered before the sixteenth day of sickness. Of the 1,746 females so reported, 58.1 per cent recovered before the eleventh day of sickness, 82.3 per cent before the sixteenth day of sickness.

The average duration of non-fatal cases of measles in the years 1893–5, was 11.3 days for males and 10.5 days for females.

PROPORTION OF MEASLES IN THE DIFFERENT MONTHS OF THE YEAR 1895.

Table 20 exhibits evidence, from two sources, on the proportion of measles reported in each month of the year 1895, namely the sickness statistics and the contagious-disease statistics. The *first* line states the per cent of all weekly postal-card *reports*, made by physicians in active general practice, which reported the presence of measles under their observation. The *second* line states the average per cent of all these *reporters* who stated the presence of measles. The *third* line states the average order of prevalence of measles in the list of diseases reported. The *fourth* line represents the *prevalence* of measles, according to the sickness statistics, being a combination of the first and third lines of this table (the method of combining them is explained on pages 122–3 of the Annual Report of this Board for the year 1890). In this fourth line the smallest numbers indicate the greatest prevalence,—for instance, June is 1 or *first* in prevalence,—more measles in June than in any other month; May is 2 or *second* in prevalence; April is 3 or *third* in prevalence; and so on. The *fifth* line represents by months the number of outbreaks of measles reported to this Office by health officers and clerks, including only the reports which gave the dates of outbreaks,—reports of 46 outbreaks did not give dates and, of course, those outbreaks could not be included in this line.

The evidence of the sickness statistics, summarized in the fourth line of this table (20) indicates that the maximum prevalence of measles in Michigan in 1895 occurred in June, and the minimum in September. The fifth line of the table, which is based on the contagious-disease statistics, indicates that the maximum number of reported outbreaks occurred in June and the minimum in October. This evidence is only for a single year, and might, therefore, be exceptional. In Exhibit XX., page 135, of this Annual Report for 1896, is a statement of the average per cent of weekly card reports stating the presence of measles by months for the eighteen years, 1877–94, from which it appears that the maximum occurs in June, and the minimum in October.

TABLE 20.—*Measles in Michigan during the year 1895, exhibiting, by months, the per cent of all weekly card-reports received which stated the presence of measles; the average per cent of all observers reporting weekly who reported measles; the average order of prevalence of measles where it was present; the prevalence of measles, according to the sickness statistics, and the number of outbreaks of measles reported by health officers and clerks of local boards of health.*

1895.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Per cent of weekly card reports stating presence of measles	4	3	4	5	6	7	8	4	2	2	0.2	2	3
Average per cent of observers who reported measles present	8	9	8	12	9	13	14	9	4	3	1	4	6
Average order of prevalence where present	3.1	4.2	2.9	3.0	3.1	2.4	2.9	3.3	2.3	5.3	1.0	2.5	2.8
Prevalence*	7	12	5	4	3	2	1	9	8	13	6	11	10
Outbreaks†	322	23	14	23	34	28	35	12	11	9	5	9	19

* According to the sickness statistics, as explained in the text accompanying this table. In the fourth line of figures in this table, the smallest numbers indicate the greatest prevalence.

† The numbers in this line show the numbers of outbreaks which *began* in each month. There were 46 reported outbreaks in this year the dates of which were not given.

Immigration and Measles.

Twenty notifications of the arrival at the seaboard of vessels bearing immigrants exposed to measles on board those vessels, and destined for localities in Michigan, were received at this office during the year. The six localities for which the immigrants were destined, the health officers of which were promptly notified, were: Detroit, in ten instances; Grand Rapids, in four instances; Iron Mountain, in three instances; the other notifications were of immigrants destined for the cities of St. Joseph, Ishpeming and Negaunee, and the township of Calumet, Houghton county. The purpose of the notification is to enable the local health officers to guard against the spread of the disease. Measles was not reported from any of these localities in Michigan as the direct result of infection from those immigrants. However, the epidemic prevalence of measles in Michigan seems to follow the epidemic prevalence of measles in countries from which immigrants have been coming to Michigan.

TYPHOID FEVER IN MICHIGAN.—DURING THE YEAR ENDING DECEMBER 31, 1895.

During the year ending December 31, 1895, there were reported to the Secretary of the State Board of Health 800 outbreaks of typhoid fever (includes "typho-malarial") in 695 localities in Michigan in which there were reported to have occurred 3,751 cases and 621 deaths. Notwithstanding the marked improvement which the State Board of Health has succeeded in bringing about both in promptness and accuracy of reports of local health officials to the central office, it is still evident that not all cases of sickness and deaths from typhoid fever are yet reported. For the year 1895, there were reported to the Secretary of State 660* deaths from typhoid fever,—39 more than were reported to this Office. The Secretary of the State Board of Health has estimated that in past years the deaths reported to the Secretary of State should be increased by about 40 per cent in order to equal the actual number of deaths which occurred; according to this estimate, there were probably about 924 deaths from typhoid fever in Michigan during the year 1895.

TYPHOID FEVER IN 1895, COMPARED WITH PREVIOUS YEARS.

Comparisons with previous years, to ascertain the comparative increase or decrease of the prevalence of typhoid fever in this State, are interesting and instructive, and they would be more so if there existed a fixed basis on which to found such comparisons; but from year to year there has been a steady improvement, both in the methods adopted by the State Board of Health in securing and compiling reports, and in the efforts made by the local health officials throughout the State to furnish in their reports the information desired by the State Board. It is, therefore, still impossible to determine the exact increase or decrease of prevalence of the disease in this State by comparisons of the numbers of outbreaks of the disease, and the cases and deaths reported to this Office year by year. This fact should be borne in mind when referring to Table 1.

Typhoid fever occurs in waves, the principal waves appearing to be about twelve years apart, with one or two minor waves intervening. This may be seen by referring to Table 2 and the accompanying diagram, representing the number of deaths per 100,000 persons living. The diagram shows that there has been a considerable reduction in the mortality-rates from typhoid fever in Michigan, especially since 1873. The cause for the great rise in typhoid fever in certain years is to be sought for in the fouling of the water supply; and so far as relates to country districts and places depending upon wells for a water supply, the cause is to be sought for in the fall in the ground water, in wells, etc., as has been pointed out in the preceding reports. Possibly also, in filthy places, the extreme dryness of the surface soil may be found to have causal relation, because the germs are not destroyed at once by drying, and may, therefore, be wafted about by currents of air. Table 2 and the illustrative diagram† probably quite accurately represent the annual fluctuations of, though not the total deaths from, typhoid fever in Michigan during the twenty-eight years, 1868–95, as the law for collecting and compiling this information in the office of the Secretary of State has remained nearly the same throughout the twenty-eight years.

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*These 660 deaths do not include those reported as caused by typho-malarial fever, while the 621 reported to this Office include those reported as caused by typhoid fever and typho-malarial fever.

†Table two and the diagram [plate 843] are printed on a following page.

TABLE 1.—TYPHOID FEVER.—*Exhibiting the number of Outbreaks, Localities, Cases and Deaths reported for each of the twelve years, 1884–95; also for some of those years the average Cases and Deaths per Outbreak, the Deaths to 100 Cases, and the number of Special Final reports received.*

Year.	Outbreaks Reported.	Localities Reported.	Cases Reported.	Deaths Reported.	Average Cases per Outbreak.	Average Deaths per Outbreak.	Deaths per 100 Cases.	Final Reports Received.
1884	----------	245	969	290	----------	----------	27	----------
1885	218	200	715	194	3.28	.89	23	----------
1886	290	282	1,194	282	4.15	.75	18	60
1887	335	320	3,424	411	*7.24	*1.23	17	46
1888	316	296	1,511	310	4.78	.98	21	60
1889	432	398	2,530	402	†5.17	†.93	†18	115
1890	330	310	1,924	304	5.83	.92	16	135
1891	543	501	4,670	697	8.60	1.28	15	208
1892	527	484	2,591	538	4.92	1.02	21	216
1893	545	504	‡3,512	594	6.44	1.09	17	230
1894	600	530	2,805	506	4.67	.84	18	321
1895	800	695	3,751	621	4.69	.78	17	449
Averages, 1886-95	472	432	2,791	467	5.65	.98	18	184

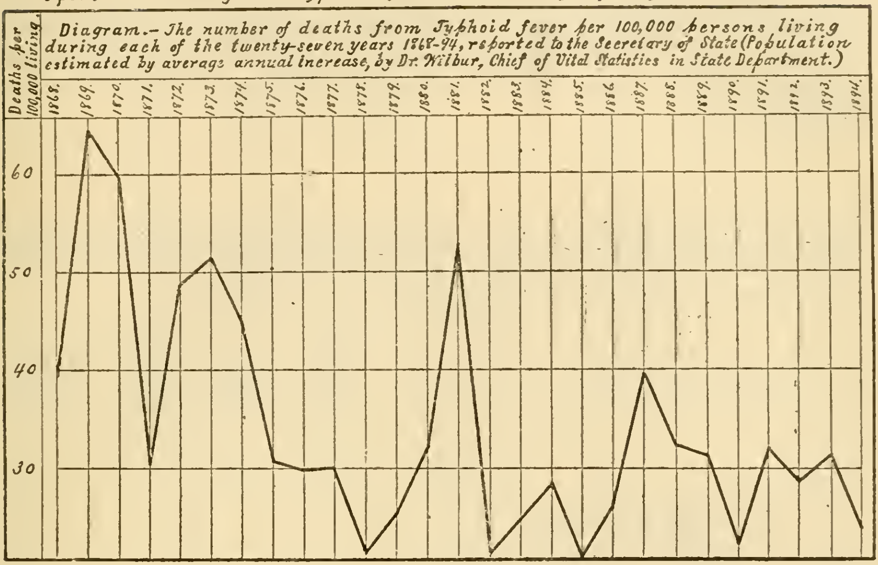
* The large average numbers of cases and deaths per outbreak in 1887 is partially accounted for by the fact that in two outbreaks the disease became epidemic, resulting in an aggregate of 535 cases and 73 deaths.

† In computing the average numbers of cases and deaths per outbreak, and the per cent ratio of deaths to cases in 1889, the outbreak at Negaunee, in which 300 cases were reported, is omitted, because the number of deaths which occurred in that outbreak was not reported.

‡ The large number of cases reported in 1893 is accounted for by the fact that in Ironwood the disease became epidemic, and the one outbreak resulted in 824 cases and 38 deaths.

TABLE 2.—*Exhibiting the reported number of deaths from Typhoid Fever per 100,000 persons living in Michigan in each of the 28 years, 1868–95. Compiled from the Secretary of State's Vital Statistics of Michigan. (Population estimated by average annual increase, by Dr. Wilbur, Chief of Vital Statistics in State Department.)*

Year.	1868.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876.	1877.	1878.	1879.	1880.	1881.
Deaths	39.20	64.44	59.46	30.34	48.64	51.29	44.68	30.70	29.67	29.98	21.28	25.26	32.07	52.66
Year.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.
Deaths	21.41	24.92	28.41	20.85	26.22	39.40	32.06	31.15	22.21	31.97	28.65	31.25	23.91	28.97



Reported deaths from Typhoid fever in Michigan, 27 years, 1868-94.

[PLATE 245]

Table 1 of this article makes a significant showing, when considered in connection with the very low water in the wells, resulting from the drouth in 1895. It shows: That there was an increase of about thirty-four (33.7) per cent in the reported sickness from typhoid fever in 1895 compared with 1894; that there was an increase in the reported deaths in 1895 of about twenty-three (22.7) per cent over 1894; that the number of outbreaks in 1895 was thirty-three ($33\frac{1}{3}$) per cent greater than in 1894; that the number of final reports was forty per cent greater in 1895 than in 1894.

A study of Table 1, comparing 1895 with 1893 also shows a slight increase of cases and deaths in 1895, there being, however, only .07 per cent more cases and .05 per cent more deaths in 1895 than in 1893; the increase in the number of outbreaks reported and the number of final reports, however, was very marked. There were forty-seven per cent more outbreaks and ninety-five more final reports in 1895 than in 1893. This, taken in connection with the steady increase in the numbers of outbreaks reported and the greatly increased number of final reports, continues to indicate that year by year a larger number of the outbreaks of typhoid fever which occur in this State are being reported to this Office.

Table 1 also shows that, although the numbers of reported cases and deaths were greater in 1895 than in either 1894 or 1893, the fatality, that is, the proportion of cases which proved fatal, were less in 1895 than in 1894 and the same as in 1893, and was also less than the average for the 12 years, 1884–95.

As stated on the first page of this article, however, implicit reliance cannot yet be placed in the several comparisons which grow out of Table 1; because so much depends upon methods of reporting cases and deaths; for instance, only fatal cases were reported from Detroit in 1894; and the less fatality in 1893 was apparently due to the nature of the epidemic in Ironwood.

Both tables 3 and 4 show that the death-rate from typhoid fever in the State in 1895 was 2.73 per 10,000 population. This death-rate is slightly higher than in 1893 (2.69) and in 1894 (2.30 per 10,000 population). The death-rates based on the number of deaths reported to the Secretary of State differ slightly from those based on the numbers of deaths reported to this Office.

TABLE 3.—*Exhibiting the Population of Michigan for the year 1895, by tiers of counties (Upper Peninsula as one tier); also the numbers of cases of, and deaths from, Typhoid Fever* REPORTED *from each of these divisions for 1895, and the numbers of cases and deaths per 10,000 population of each division.*

State, and Counties Grouped by tiers, most Northern Counties First.		Population, 1895.*	Reported Cases of Typhoid Fever, 1895.	Reported Cases per 10,000 of Population.	Reported Deaths from Typhoid Fever, 1895.	Reported Deaths per 10,000 of Population.
State		2,278,579	3,751	16.46	621	2.73
Upper Peninsula	Keweenaw. Ontonagon. Houghton. Baraga. Marquette. Alger. Schoolcraft. Luce. Chippewa. Gogebic. Iron. Dickinson. Menominee. Delta. Mackinac.	213,073	425	19.95	39	1.83
Eleventh tier of counties	Emmet. Charlevoix. Cheboygan. Presque Isle.	43,372	92	21.19	22	5.07
Tenth tier of counties	Leelanaw. Antrim. Otsego. Montmorency. Alpena.	48,721	70	14.37	18	3.69
Ninth tier of counties	Benzie. G'd Traverse. Kalkaska. Crawford. Oscoda. Alcona.	42,933	113	26.32	19	4.43
Eighth tier of counties	Manistee. Wexford. Missaukee. Roscommon. Ogemaw. Iosco.	67,590	159	23.52	25	3.70
Seventh tier of counties	Mason. Lake. Osceola. Clare. Gladwin. Bay. Huron. Arenac.	157,735	226	14.33	48	3.04
Sixth tier of counties	Oceana. Newaygo. Mecosta. Isabella. Midland.	92,559	270	29.17	40	4.32
Fifth tier of counties	Muskegon. Montcalm. Gratiot. Saginaw. Tuscola. Sanilac.	250,905	426	16.98	67	2.67
Fourth tier of counties	Ottawa. Kent. Ionia. Clinton. Shiawassee. Genesee. Lapeer. St. Clair.	384,315	801	20.84	113	2.94
Third tier of counties	Allegan. Barry. Eaton. Ingham. Livingston. Oakland. Macomb.	231,765	306	13.20	44	1.90
Second tier of counties	Van Buren. Kalamazoo. Calhoun. Jackson. Washtenaw. Wayne.	514,449	486	9.45	126	2.45
First tier of counties	Berrien. Cass. St. Joseph. Branch. Hillsdale. Lenawee. Monroe.	231,167	377	16.31	60	2.60

* Population estimated by average annual increase (arithmetical method), based on U. S. Census of 1890 and the State Census of 1894. Computed in the Office of the State Board of Health.

TABLE 4.—*Numbers of Cases and Deaths reported from Typhoid Fever, and the Cases and Deaths per 10,000 persons living in each county in Michigan during the year 1895. (Compiled from reports of health officers, clerks, etc.)*

Counties.	Population of Michigan for 1895.*	Number of reported		Number per 10,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.
State	2,278,579	3,751	621	16.46	2.73
Alcona	5,420	12	2	22.14	3.69
Alger	1,422	0	0	0	0
Allegan	39,246	31	7	7.90	1.78
Alpena	18,251	11	5	6.03	2.74
Antrim	12,931	40	5	30.93	3.87
Arenac	7,258	24	1	33.07	1.38
Baraga	4,531	18	0	39.73	0
Barry	23,678	41	3	17.32	1.30
Bay	62,527	62	26	9.93	4.16
Benzie	8,770	35	7	39.99	7.98
Berrien	46,723	73	22	15.62	4.71
Branch	26,061	61	13	23.41	4.99
Calhoun	48,465	85	12	17.54	2.48
Cass	21,232	43	4	20.25	1.88
Charlevoix	11,464	26	4	22.68	3.49
Cheboygan	14,379	22	1	15.30	.70
Chippewa	16,148	58	2	35.92	1.24
Clare	8,081	37	4	45.79	4.95
Clinton	26,200	48	7	18.32	2.67
Crawford	2,647	1	0	3.78	0.0
Delta	20,245	4	0	1.98	0.0
Dickinson	14,887	55	9	36.94	6.05
Eaton	32,749	58	5	17.71	1.52
Emmet	11,312	42	16	37.13	14.14
Genesee	40,834	63	4	15.43	.98
Gladwin	5,073	9	3	17.74	5.91
Gogebic	14,312	40	4	27.95	2.79
G'd Traverse	18,555	50	7	26.95	3.71
Gratiot	28,803	87	13	30.21	4.51
Hillsdale	30,175	29	3	9.61	.99
Houghton	46,338	59	5	12.73	1.08
Huron	33,184	53	7	15.97	2.11
Ingham	40,195	93	12	23.11	2.98
Ionia	35,325	75	9	21.23	2.55
Iosco	11,619	39	7	33.57	6.02
Iron	5,360	1	0	1.87	0.0
Isabella	22,103	70	11	31.67	4.98
Jackson	46,911	51	3	10.87	.64
Kalamazoo	42,752	71	11	16.61	2.57
Kalkaska	5,760	8	2	13.89	3.47
Kent	124,942	273	43	21.93	3.44
Keweenaw	2,783	4	4	14.37	14.37
Lake	5,745	6	1	10.44	1.74
Lapeer	28,795	51	10	17.71	3.47
Leelanaw	9,938	13	5	13.08	5.03
Lenawee	48,564	67	5	13.80	1.03
Livingston	20,332	10	0	4.92	0.0
Luce	2,321	1	0	4.31	0.0
Mackinac	7,089	7	0	9.87	0.0
Macomb	32,531	25	6	7.68	1.84
Manistee	26,585	49	10	18.43	3.76
Marquette	38,490	126	5	32.74	1.30
Mason	18,931	18	4	9.51	2.11
Mecosta	20,987	45	8	21.45	3.81
Menominee	24,041	34	9	14.14	3.74
Midland	13,858	33	6	23.81	4.33
Missaukee	7,432	46	4	61.89	5.38
Monroe	33,392	72	8	21.56	2.40
Montcalm	34,538	48	11	13.90	3.18
Montmorency	2,676	1	0	3.74	0.0
Muskegon	36,652	18	2	4.91	.55
Newaygo	18,787	48	6	25.55	3.19
Oakland	43,034	48	11	11.15	2.56
Oceana	16,824	74	9	43.75	5.35
Ogemaw	5,652	13	2	23.	3.54
Ontonagon	7,652	17	1	22.22	1.31
Osceola	16,936	17	2	10.04	1.18
Oscoda	1,781	7	1	39.30	5.62
Otsego	4,925	5	3	10.15	6.09
Ottawa	40,014	66	11	16.49	2.75
Presque Isle	6,217	2	1	3.22	1.61
Roscommon	1,563	3	2	19.19	12.80
Saginaw	81,740	85	11	10.31	1.35
Sanilac	34,284	97	12	28.29	3.50
Schoolcraft	7,454	1	0	1.34	0.0
Shiawassee	33,330	79	8	23.70	2.40
St. Clair	54,875	146	21	26.60	3.83
St. Joseph	25,020	32	5	12.79	2.00
Tuscola	34,888	91	18	26.08	5.16
Van Buren	31,189	65	8	20.84	2.57
Washtenaw	43,834	20	4	4.56	.91
Wayne	301,298	194	88	6.44	2.92
Wexford	14,739	9	0	6.11	0.0

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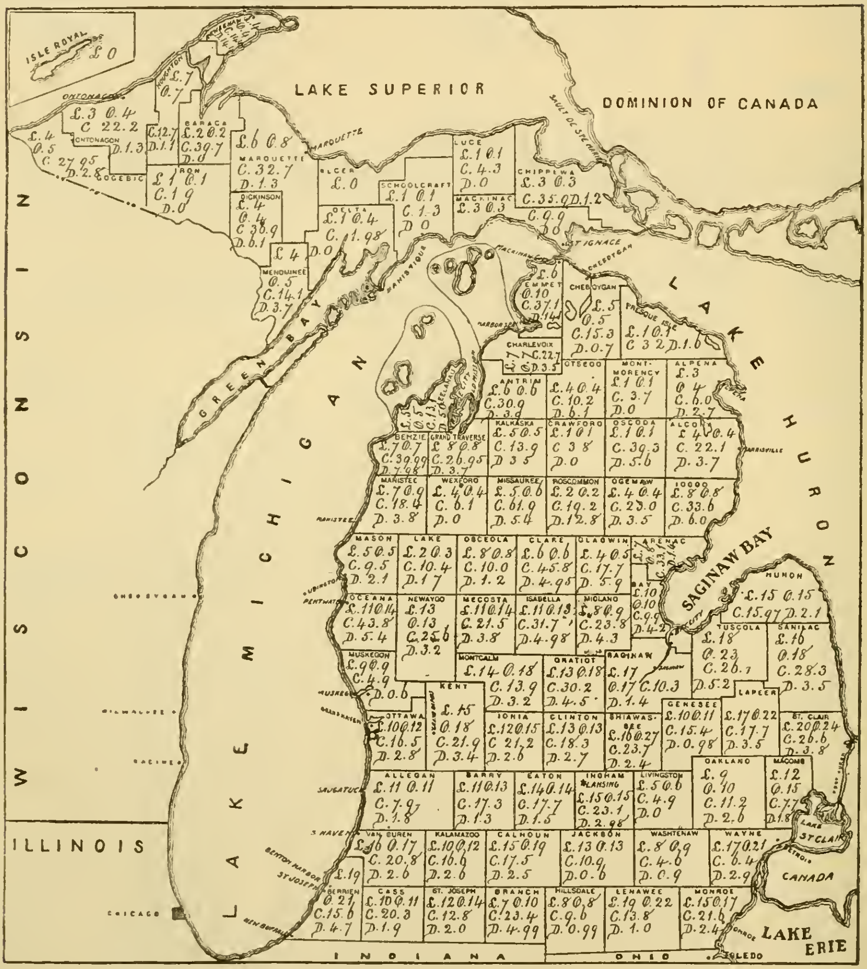
*Population estimated by average annual increase, (arithmetical method), based on U. S. Census of 1890 and the State Census of 1894. Computed in the Office of the State Board of Health.

DISTRIBUTION OF TYPHOID FEVER IN MICHIGAN IN 1895.

BY COUNTIES, THE REPORTED CASES AND DEATHS PER 10,000 INHABITANTS.


ISLE ROYALE L.0
LAKE SUPERIOR
DOMINION OF CANADA
ONTONAGON L.3 O.4 C 22.2 D.1.3
GOGEBIC L.4 O.5 C.27.95 D.2.8
HOUGHTON L.7 O.7
L.12.7 D.1.1
BARAGA L.2 O.2 C.39.7 D.0
MARQUETTE L.6 O.8 C.32.7 D.1.3
IRON L.1 O.1 C.1.9 D.0
DICKINSON L.4 O.4 C.38.9 D.6.1
L.4 D.0
MENOMINEE O.5 C.14.1 D.3.7
ALGER L.0
SCHOOLCRAFT L.1 O.1 C.1.3 D.0
DELTA L.1 O.4 C.11.98 D.0
LUCE L.1 O.1 C.4.3 D.0
MACKINAC L.3 O.3 C.9.9 D.0
CHIPPEWA L.3 O.3 C.35.9 D.1.2
SAULT DE STE MARIE
ST IGNACE
EMMET L.6 O.10 C.37.1 D.1.4
CHEBOYGAN L.5 O.5 C.15.3 D.0.7
PRESQUE ISLE L.1 O.1 C 3.2 D.1.6
CHARLEVOIX C.22.7 D.3.5
ANTRIM L.6 O.6 C.30.9 D.3.9
OTSEGO L.4 O.4 C.10.2 D.6.1
MONTMORENCY L.1 O.1 C.3.7 D.0
ALPENA L.3 O.4 C.6.0 D.2.7
BENZIE L.7 O.7 C.39.99 D.7.98
GRAND TRAVERSE L.8 O.8 C.26.95 D.3.7
KALKASKA L.5 O.5 C.13.9 D.3.5
CRAWFORD L.1 O.1 C 3.8 D.0
OSCODA L.1 O.1 C.39.3 D.5.6
ALCONA L.4 O.4 C.22.1 D.3.7
MANISTEE L.7 O.9 C.18.4 D.3.8
WEXFORD L.4 O.4 C.6.1 D.0
MISSAUKEE L.5 O.6 C.61.9 D.5.4
ROSCOMMON L.2 O.2 C.19.2 D.12.8
OGEMAW L.4 O.4 C.23.0 D.3.5
IOSCO L.8 O.8 C.33.6 D.6.0
MASON L.5 O.5 C.9.5 D.2.1
LAKE L.2 O.3 C.10.4 D.1.7
OSCEOLA L.8 O.8 C.10.0 D.1.2
CLARE L.6 O.6 C.45.8 D.4.95
GLADWIN L.4 O.5 C.17.7 D.5.9
ARENAC
OCEANA L.11 O.14 C.43.8 D.5.4
NEWAYGO L.13 O.13 C.25.6 D.3.2
MECOSTA L.11 O.14 C.21.5 D.3.8
ISABELLA L.11 O.13 C.31.7 D.4.98
MIDLAND L.8 O.9 C.23.8 D.4.3
BAY L.10 O.10 C.9.9 D.4.2
SAGINAW BAY
HURON L.15 O.15 C.15.97 D.2.1
TUSCOLA L.18 O.23 C.26.1 D.5.2
SANILAC L.16 O.18 C.28.3 D.3.5
MUSKEGON L.9 O.9 C.4.9 D.0.6
MONTCALM L.14 O.18 C.13.9 D.3.2
GRATIOT L.13 O.18 C.30.2 D.4.5
SAGINAW L.17 O.17 C.10.3 D.1.4
LAPEER
KENT L.15 O.18 C.21.9 D.3.4
OTTAWA L.10 O.12 C.16.5 D.2.8
IONIA L.12 O.15 C 21.2 D.2.6
CLINTON L.13 O.13 C.18.3 D.2.7
SHIAWASSEE L.16 O.27 C.23.7 D.2.4
GENESEE L.10 O.11 C.15.4 D.0.98
L.17 O.22 C.17.7 D.3.5
ST. CLAIR L.20 O.24 C.26.6 D.3.8
ALLEGAN L.11 O.11 C.7.97 D.1.8
BARRY L.11 O.13 C.17.3 D.1.3
EATON L.14 O.14 C.17.7 D.1.5
INGHAM LANSING L.15 O.15 C.23.1 D.2.98
LIVINGSTON L.5 O.6 C.4.9 D.0
OAKLAND L.9 O.10 C.11.2 D.2.6
MACOMB L.12 O.15 C.7.7 D.1.8
VAN BUREN L.16 O.17 C.20.8 D.2.6
KALAMAZOO L.10 O.12 C.16.6 D.2.6
CALHOUN L.15 O.19 C.17.5 D.2.5
JACKSON L.13 O.13 C.10.9 D.0.6
WASHTENAW L.8 O.9 C.4.6 D.0.9
WAYNE L.17 O.21 C.6.4 D.2.9
BERRIEN L.19 O.21 C.15.6 D.4.7
CASS L.10 O.11 C.20.3 D.1.9
ST. JOSEPH L.12 O.14 C.12.8 D.2.0
BRANCH L.7 O.10 C.23.4 D.4.99
HILLSDALE L.8 O.8 C.9.6 D.0.99
LENAWEE L.19 O.22 C.13.8 D.1.0
MONROE L.15 O.17 C.21.6 D.2.4
LAKE MICHIGAN
LAKE HURON
GREEN BAY
WISCONSIN
ILLINOIS
INDIANA
OHIO
CANADA
LAKE ST CLAIR
LAKE ERIE
DETROIT
TOLEDO
CHICAGO
RACINE
MILWAUKEE
SHEBOYGAN
MANISTEE
LUDINGTON
PENTWATER
MUSKEGON
GRAND HAVEN
SAUGATUCK
SOUTH HAVEN
BENTON HARBOR
ST JOSEPH
NEW BUFFALO
MARQUETTE
MANISTIQUE
HARBOR SPRINGS
HARRISVILLE
PORT HURON

L.= Localities; O.= Outbreaks; C.= Cases per 10,000 population; D.= Deaths per 10,000 population

[PLATE 883]

Sickness-rates from reported typhoid fever in 1895.

While it is probable that the reporting of cases of sickness from typhoid fever is not as complete as the reporting of deaths from that disease, yet comparisons may be made, subject to a mental reservation that not all cases are reported, and that it is quite possible that the omissions are greater in some parts of the State than in others.

Considering the State by tiers of counties, Table 3 shows that the greatest reported prevalence of typhoid fever was in the sixth tier of counties, where the sickness-rate reached 29.17 cases per 10,000 inhabitants, which is nearly double the reported sickness rate for the State as a whole; and the least prevalence was in the second tier, where the sickness-rate was only 9.45 cases. In the eighth, ninth and eleventh tiers the sickness-rate, though not so high as that in the sixth tier, was considerably higher than the average rate for the State.

In 1893 the sickness-rate from typhoid fever in the Upper Peninsula was nearly five times as great as the sickness-rate for the whole State. In 1894 it was over twice as great; but in 1895 the sickness-rate in the Upper Peninsula was much lower than in 1893 and 1894, and was comparatively much nearer the sickness-rate for the State.

A study of the cause of so high a sickness-rate in the Upper Peninsula in 1893 was made on page 261 of the Annual Report of this Board for 1894.

The year 1895 has been characterized by an absence of severe epidemics of typhoid fever; the general increase in the reported numbers of cases in this year may be attributed in a large measure to the drouth and consequent low water in wells.

By counties, the greatest sickness-rate reported from this disease in 1895 was in Missaukee county, where the ratio of cases to population was 61.89 per 10,000. The sickness-rates of several other counties were largely in excess of the average rate for the whole State, they being as follows:—Clare 45.79, Oceana 43.75, Baraga 39.73, Benzie 39.99, Oscoda 39.30, Emmet 37.13, Dickinson 36.94, Chippewa 35.92, Iosco 33.57, and Arenac 33.07 per 10,000 persons living in those counties; whereas the average sickness-rate for the State was only 16.46 per same number of inhabitants. Alger county, with a population of 1,422, was the only county from which typhoid fever was not reported during 1895.

Death-rates From Reported Typhoid Fever in 1895.

The last columns in Tables 3 and 4 supply data for a more satisfactory comparison of sections of the State with reference to typhoid fever than is supplied by the data relative to cases of sickness from that disease.

Table 3 shows the greatest death-rate to have been in the eleventh tier of counties, and the tenth, ninth, eighth, seventh, and sixth tiers to have each had a greater death-rate than the average for the whole State, in 1895.

The fourth tier, including Ottawa, Kent, Ionia, Clinton, Shiawassee, Genesee and St. Clair counties, has next to the largest death-rate.

Although as shown in Table 3, the eleventh tier of counties has the highest death-rate, Table 4 shows that none of the counties comprising that tier except Emmet had many deaths. Charlevoix had 4, Cheboygan 1, and Presque Isle 1, while Emmet had 16 to a population of 11,312, giving a death-rate of 14.14 per 10,000 population, the second highest death-rate of the counties of the State.

The ninth tier of counties is second in order of highest death-rate. In this tier the counties have small populations, only one of them, Grand Traverse, having over 9,000 inhabitants. So that while the actual numbers of deaths in the counties in this tier are small, the death-rates are high.

The sixth tier of counties had a death-rate of 4.32, nearly twice as large as the death-rate for the State. The two counties in this tier which have the highest death-rates are Oceana and Isabella. In Oceana, Crystal Tp. furnished 3 deaths and Shelby Tp. 2, which, together with 9 other localities, make up a total of 9 deaths, which, spread over a population of 16,824, gives a death-rate for that county of 5.35. The death-rate for Isabella county comes mainly from the Tp. of Chippewa, which has 3 deaths and Isabella Tp. and Mt. Pleasant city, each with 2, together with the deaths from 8 other localities, make up a total of 11 deaths, and a death-rate for the county of 4.98.

The general occurrence of typhoid fever in Michigan in 1895, and its generally even distribution throughout the State has not left a conspicuously high death-rate except in those counties mentioned.

In 1895 Alger was the only county from which no typhoid fever was reported. From ten other counties, only, the reports showed that there were no deaths. In 1894, typhoid fever was not reported at all from nine counties, and eight other counties heard from, reported no deaths.

Sickness and Death-rates From Typhoid Fever Higher in Thickly Inhabited Localities.

Numerous instances taken from the compilations of the reports of health officers for various years, seem to demonstrate beyond a doubt that the sickness and death-rates are higher in centres of population than in the rural districts. In 1895 there were 24 representative counties wherein the sickness and death-rates in some one or two centres of population—cities—were conspicuously higher than the rates for the counties in which they were situated, aside from these particular localities, as: in Iron Mountain, Dickinson county, the sickness-rate was 62.5 and the death-rate 10.3 per 10,000 inhabitants; while in Dickinson county, aside from Iron Mountain, the sickness-rate was 9.8 and the death-rate was 1.4. In Lansing, Ingham county, there were 33.3 cases and 3.6 deaths per 10,000 inhabitants, while in Inghan county aside from the city of Lansing there were but 16.1 cases and 2.5 deaths to the same number of inhabitants. The city of Jackson, in Jackson county, had a death-rate of 1.3 and a sickness-rate of 14.3; while the county, outside of the city, had no deaths at all, and a sickness-rate of only 7.5. Kalamazoo's sickness-rate was 18.3 and death-rate 3.2, and Kalamazoo county, outside the city, had a sickness-rate of 14.8 and a death-rate of 1.9. In Manistee county, the city of Manistee had a sickness-rate of 21.3 and a death-rate of 4.4, while the county, outside of the city, had a sickness-rate of 15.4 and a death-rate of 3.1. In Marquette county, the two cities, Ishpeming and Marquette, showed a much higher sickness and death-rate than the county; that of Marquette being 85.0 sickness-rate, and 4 death-rate; Ishpeming 23.7 sickness-rate, and .85 death-rate. The county, outside of the two cities had a sickness-rate of only 8.8 and there were no deaths in the county, except those reported from the two cities mentioned.

Typhoid Fever Spreads Most From Thickly-Inhabited Places.

Of the localities from which typhoid fever was spread into Michigan from "Outside the State" such localities as are mentioned definitely are generally cities. Chicago was reported as having been the source of infection of typhoid fever in three instances, with a result of fifty cases and nine deaths; Duluth, Minn., and Toledo, Ohio, were each reported as having been the source of contagium in two instances, with a result of 4 cases and 1 death. Joliet, Ill.; Elkhart and Goshen, Ind.; Minneapolis, Minn.; Butte City, Mont.; and Lakeside, Ohio, were each reported as having been the source of contagium in one instance, with a result of 16 cases and 2 deaths.

The other "Outside" localities reported as having been the source of contagium of outbreaks of typhoid fever in Michigan were more indefinitely reported as "Ohio," "Wisconsin," "Canada," "Indiana," "Illinois," "Mississippi," and "Pennsylvania."

In four instances Grand Rapids was reported as having been the source of contagium, with a result of 7 cases. Detroit was reported as having been the source of contagium in 4 instances, with a result of 5 cases. Benton Harbor was reported as the source of contagium in 3 instances, with a result of 11 cases and 2 deaths. Harbor Springs was reported as having been the primary source of contagium in 3 instances, with a result of 23 cases and 7 deaths. Mt. Pleasant was the reported source of contagium in three instances, and Kalamazoo in 2 instances where the reports were definite, and in two instances that were reported as "probably traced." Traverse City, Clifford, Adrian, Reed City, Durand, Vassar and Cadillac were each reported as having been the source of infection in 2 instances.

Of the 90 localities within and without the State from which typhoid fever was reported to have spread, in Michigan, in 1895 (Table 7) 51 were cities or villages from which 73 localities were infected, 25 were rural localities from which 28 other localities were infected and 14 localities which were not specified spread typhoid fever to 14 other localities. In the second instances, or where third localities were infected from the second, six out of the seven localities from which typhoid fever spread were cities or villages, and only one from a rural locality.

TYPHOID FEVER IN EACH MONTH OF THE YEAR 1895.

TABLE 5.—*Exhibiting the reported number of outbreaks of Typhoid Fever which Began, the number which Ended, and the number of outbreaks which were Present, in each Month of the Year 1895, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Outbreaks began..	38	20	12	18	12	32	65	142	147	150	51	29	716
Outbreaks ended..	7	19	21	16	5	10	22	28	57	89	138	143	555
Outbreaks present	40	47	42	38	35	62	113	231	329	402	357	257	....

The last line of figures in Table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. Frequently the time of the beginning of an outbreak is reported, but the time of the ending of the outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months. There were 161 more beginnings than endings of outbreaks reported during the year 1895.

TABLE 6.—*Exhibiting the Number and Per Cent of Cases of Typhoid Fever in Michigan in each Month during the Year 1895. (Includes each case for which the time during which it existed, was stated in the reports. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.)*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number of cases sick in any part of the month	102	102	88	58	60	98	190	461	814	1,241	982	521
Per cent the cases sick in each month were of total reported cases	2.72	2.72	2.35	1.55	1.60	2.61	5.07	12.29	21.70	33.08	26.18	13.89

The first line of figures in Table 6 shows the number of cases reported sick in any part of each month. As some of the cases were sick longer than one month, they are included in the cases sick in more than one month, therefore the sum of the cases sick in all the months exceeds the total of reported cases in 1895; and as the last line of figures in this table shows the per cent the cases sick in each month were of the exact number of cases *reported* to this Office in 1895, the sum of the figures in the last line of the table exceeds 100.

SOURCE OF CONTAGIUM OF TYPHOID FEVER.

EXHIBIT I.—*The reported "Source of Contagium" of Cases of Typhoid Fever in Michigan during the year 1895.*

Reported Sources.	Cases.
Traced to former cases*	295
Probably traced to former cases	31
Attributed to infected, contaminated, or surface water	1,163
Cases reported as coming from outside jurisdictions†	158
Attributed to defective sewerage or drainage	24
Attributed to filthy or unsanitary conditions	59
Contaminated milk or food supply	4
Cases, the sources of contagium of which were reported as unknown	789
Cases, the sources of contagium of which were not reported, or the statements were too indefinite for classification‡	1,228
Total	3,751

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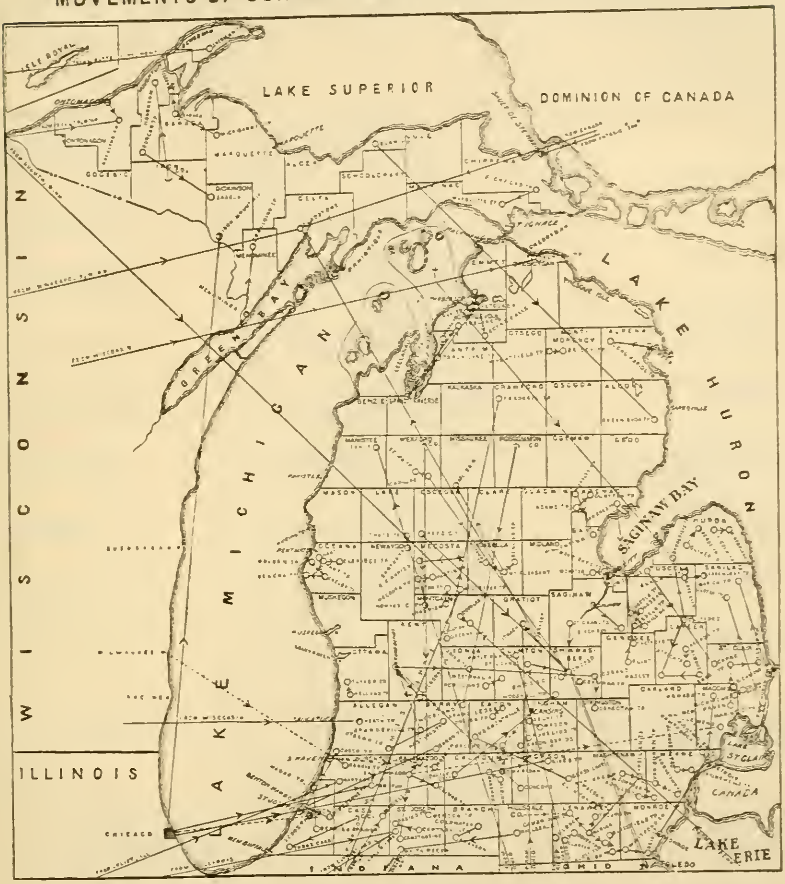
* Details of some of these instances, in which the disease came from without the jurisdiction, are stated in the text under the sub-head "Typhoid Fever Traced to former Cases in Distant Places."

† Details of some of these instances may be seen under the sub-head "Typhoid Fever Traced to Outside Jurisdictions."

‡ Includes cases attributed to "Malaria", "Overwork and Exposure", "Sporadic", "Endemic", and in 1895, 13 cases were attributed to "Yellows in Peaches".

MOVEMENTS OF CONTAGIUM OF TYPHOID FEVER IN 1895.



THIS MAP ILLUSTRATES TABLE 7. LINES CONNECT THE LOCAITIES INFECTED. THE ARROWHEADS INDICATE THE DIRECTIONS OF THE MOVEMENTS.

——→ DEFINITELY TRACED. - - - - - - - -→ PROBABLY TRACED.

* "EASTERN PART OF MECOSTA COUNTY." † "NORTHERN MICHIGAN." ‡ TWO CASES FROM TOLEDO

[PLATE [illegible]]

TABLE 7.—*First, second and third localities, where the second locality was infected with Typhoid Fever from the first, and the third was infected from the second; and the numbers of cases and deaths from Typhoid Fever in the first, second and third localities, with the dates of the beginning and ending of each outbreak. (Compiled from reports of health officers who were able to trace the source of contagium to other localities.)*

Number.†	First Localities from which Typhoid Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
1	Alger county: Burt township	*	----	Alcona county: Greenbush township. (Oct. 8-Oct. 24.)	1	1			
2	Allegan county: Otsego township (— Nov. 2.)	2	2	Barry county: Hastings township (Sept. 20-Oct. 20.)	2	0			
3	Alpena county: Alpena city (Oct.-Nov. 16.)	6	2	Alpena county: Long Rapids twp. (Dec. 20-Jan. 14, '96.)	2	1			
4	Antrim county: Banks township (Sept.-Dec.)	6	1	Antrim county: Torch Lake township	12	0			
5	Arenac county: Adams township (Oct. 25-Dec. 25.)	4	0	Arenac county: Clayton township (Oct.-Nov. 22.)	7	1			
6	Arenac county: Au Gres township	*	----	Genesee county: Thetford township (Oct. 11-Dec. 28.)	1	0			
7	Arenac county: Moffit township	*	----	Bay county: Pinconning village (Oct. 6 —.)	1	2			
8	Baraga county: Baraga village (Sept. 25-Nov. 24.)	16	0	Houghton county: Chassell township (Dec.-Feb. 6, 1896.)	2	0			
				Marquette county: Michigamme twp. (Nov. 18 —.)	4	0			
9	Bay county: Bay City (July-Mar., 1896.)	25	7	Tuscola county: Cass City village (— Oct. 1.)	1	1	Sanilac county: Greenleaf township (Oct. 10-Dec. 24.)	1	0
10	Bay county: West Bay City	9	9	Bay county: Monitor township (Aug. 15-Dec. 25.)	13	3			
11	Berrien county: Benton Harbor city (Jan. 6-Dec.)	14	4	Allegan county: Casco township	2	0			
				Barry county: Barry township (Oct. 1-Nov. 1.)	1	0			
				Berrien county: Pipestone township (Aug. 25 —.)	8	2			
12	Berrien county: Berrien Springs vil.	*	----	Berrien county: Hagar township (Oct. 2-Nov. 30.)	3	1			
13	Branch county: Bronson village (Apr. 23-Dec. 21.)	19	3	Branch county: Coldwater city (July 1-Feb. 14, 1896.)	18	3			

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*Typhoid fever was not reported to this Office by the health officer of the "first" locality at the time it was said to have spread from there; showing that the disease, if present, was neglected; probably it was not reported to the health officer as the law requires.

†The numbers in this column refer to similar numbers before quotations in the text following this table.

TABLE 7.—Continued.—*Movement of Infection.*

Number.†	First Localities from which Typhoid Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
14	Calhoun county: Albion city (Apr.-Jan. 20, 1896.)	5	0	Calhoun county: Marengo township (Oct. 20-Nov. 30.)	1	0			
15	Calhoun county: Battle Creek city (Apr. 27-Dec. 31.)	15	6	Shiawassee county: Woodhull township (Nov. 18-Dec. 9.)	1	0			
16	Calhoun county: Sheridan township (Oct. 20-Nov. 28.)	1	0	Calhoun county: Clarence township (Oct. 17-Nov. 15.)	1	0			
17	Cass county	----	----	Berrien county: Three Oaks village (Sept. —.)	1	0			
18	Chippewa county: Pickford township	*	----	Mackinac county: Marquette township (Feb. 16-Mar. 2.)	3	0			
19	Clinton county: St. Johns village	22	1	Shiawassee county: Owosso city (July 30-Sept. 7.)	1	0	Shiawassee county: Owosso township (Oct. 19-Oct. 29.)	1	0
20	Eaton county: Brookfield township	1	1	Calhoun county: Clarence township (Apr. 2 May 2.)	12	1			
21	Eaton county: Grand Ledge village	*	----	Eaton county: Oneida township (Sept.-Nov. 15.)	1	0			
22	Eaton county: Vermontville village	*	----	Jackson county: Grass Lake village (June 29-Aug. 19.)	1	0			
23	Emmet county: Harbor Springs vil.	11	2	Emmet county: Petoskey city (Apr. 24-Mar. 10, '96.)	17	6	Charlevoix county: Bay township (Aug. 17-Oct 4.) Boyne Falls village (Nov. 22-Dec. 31.)	 5 1	 1 0
24	Genesee county: Flint city (June 22-Feb. 15, '96.)	34	4	Tuscola county: Arbela township (Nov. 30 —.)	1	0			
25	Grand Traverse county: Traverse City	16	4	Charlevoix county: Eveline township (Nov.-Jan., 1896.) Emmet county: Petoskey city (Aug. 26-Sept. 30.)	1 1	0 0			
26	Gratiot county: Ashley village	*	----	Delta county: Gladstone city (Aug. 26-Sept. 10.)	1	0			
27	Hillsdale county: Hillsdale city	*	----	St. Joseph county: White Pigeon village	1	0			
28	Houghton county: Duncan township	*	----	Dickinson county: Sagola township (Nov. 9-Dec. 23.)	2	0			
29	Huron county: Lincoln township (Aug. 24 —.)	3	0	Huron county: Bloomfield township. (Sept. 5 —.)	1	0			
30	Huron county: Oliver township (Sept. 22-Dec. 30.)	7	0	Huron county: Mead township (Dec. 14-Dec. 19.)	1	1			
31	Ionia county: Portland village	*	----	Clinton county: Westphalia township (Nov. 27-Jan. 4, '96.)	1	0			

* † These foot-notes are on the bottom of the first page of this table.

TABLE 7.—CONTINUED.—*Movement of Infection.*

Number.†	First Localities from which Typhoid Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
32	Isabella county: Mt. Pleasant city (Feb. 20-Jan., 1896.)	27	2	Isabella county: Denver township (Mar. 7-Mar. 27.)	1	1			
				Nottawa township (Oct. 16-Nov. 27.)	1	0			
				Missaukee county: McBain village (July 3-July 31.)	1	0			
33	Iron county	----	----	Houghton county: Houghton village (Sept. 24-Nov. 29.)	1	0			
34	Kalamazoo county: Kalamazoo city (— Dec. 22.)	40	7	Kalamazoo county: Climax township (Feb. 7-Apr. 5.)	4	0			
				St. Joseph county: Constantine village (Oct. 12-Dec. 21.)	3	0			
35	Kent county: Grand Rapids city (Jan. 1-Dec.)	231	34	Barry county: Orangeville township (Oct.-Dec.)	2	0			
				Ionia county: Ionia city (Oct. 12-Nov. 20.)	3	0			
				Jackson county: Concord village (Sept. 12-Oct. 5.)	1	0			
				Kent county: Caledonia township (Jan. 14-Feb. 12.)	1	0			
36	Lapeer county: Almont village (Aug. 10 —.)	3	0	Lapeer county: Hadley village (Nov. 3 —.)	2	1			
37	Lapeer county: Arcada township (Oct. 20-Dec. 21.)	1	0	Lapeer county: Attica township (Oct. 20-Nov. 5.)	1	0			
38	Lapeer county: Clifford village	*	----	Lapeer county: Hadley village (Nov. 25-Dec. 25.)	1	0			
				Huron county: Brookfield township (Nov. 20-Dec. 4.)	1	0			
39	Lenawee county: Adrian city (— Dec.)	26	2	Lenawee county: Cambridge township (Jan. 12-Feb. 9.)	1	0			
				Washtenaw county: Ypsilanti city (Apr. 6 —.)	1	0			
40	Lenawee county: Riga township (July-Nov.)	8	0	Lenawee county: Blissfield village Sept. 27-Nov. 5.)	2	0			
				Monroe county: Whiteford township (Dec. 24-Jan. 15, '96.)	1	0	Monroe county: Erie township (Jan. 2-Feb. 28.)	5	1
41	Macomb county: New Haven village	*	----	St. Clair county: Emmet township (July 20-Aug. 16.)	1	0			
42	Mecosta county: Mecosta township (Aug. 12-Dec. —.)	9	0	Mecosta county: Austin township (Sept. 1 —.)	1	0			

* † These foot-notes are on the bottom of the first page of this table.

TABLE 7.—Continued.—*Movement of Infection.*

Number.†	First Localities from which Typhoid Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
43	Menominee county: Menominee city (Jan. 2-Feb., 1896.)	22	8	Menominee county: Spaulding township (Dec.-Jan., 1896.)	2	0			
44	Montcalm county: Douglas township (Aug.-Oct.)	4	1	Montcalm county: Stanton city (Sept. 14-Oct.)	2	0			
45	Montcalm county: Greenville city (June-July 21.)	2	1	Crawford county: Frederic township (Aug. 23-Sept. 10.)	1	0			
46	Montcalm county: Lakeview village (Aug. 1-Dec. 15.)	7	3	Mecosta county: Hinton township (Dec. 1-Feb., 1896.)	1	0			
47	Montmorency county: Wheatfield township	*	----	Montmorency county: Briley township (Aug. 1-Aug. 27.)	1	0			
48	Newaygo county: Barton township (Aug. 12-Dec. 12.)	10	2	Lake county: Chase township (Oct. 5 —.)	2	0			
49	Oceana county: Hart township	*	----	Oceana county: Elbridge township (Sept. 24-Dec. 4.)	2	1			
50	Oceana county: Shelby township (July 25-Dec. 14.)	31	2	Oceana county: Benona township (Oct. 7-Nov. 14.) Golden township (Sept. 13-Oct. 25.) Hart village (Nov. 5 —.)	 1 5 3	 0 0 1			
51	Ontonagon county: Ontonagon village (Aug. 29-Nov. 5.)	11	1	Ontonagon county: Rockland township (Oct. 5-Nov. 9.)	1	0			
52	Osceola county: Reed City village (— Jan. 10, 1896.)	1	0	Montcalm county: Howard City village Oct. 28-Nov. 1.) Shiawassee county: Corunna city (Sept. 1-Sept. 22.)	1 1	1 0			
53	Ottawa county: Holland township (July 15-Dec. 12.)	19	1	Ottawa county: Oliver township (Oct. 5-Oct. 13.)	1	1			
54	Roscommon county	----	----	Barry county: Woodland village (Nov. 24-Dec. 26.)	1	0			
55	Saginaw county: Saginaw city (June 28-Mar. 29,'96.)	28	3	Saginaw county: Birch Run township (Aug. 17-Sept. 18.)	1	0			
56	Saginaw county: St. Charles village (Apr. 25-June 15.)	1	0	Shiawassee county: Owosso city (July 25-Jan. 24,'96.)	42	6	Gratiot county: Ithaca village (Sept. 22-Nov. 23.)	2	0
57	Shiawassee county: Durand village (Oct.-Feb. 1, '96.)	----	----	Ionia county: Ionia city (Oct. 20-Dec. 1.) Livingston county: Cohoctah township (— Oct. 20.)	3 1	0 0			
58	St. Clair county: Columbus township (— Nov. 25.)	1	0	Macomb county: Richmond village (Sept. 12-Dec. 10.)	4	1	Macomb county: Richmond township (Oct. 17-Dec. 7.)	1	0

* † These foot-notes are on the bottom of the first page of this table.

TABLE 7.—CONTINUED.—*Movement of Infection.*

Number.†	First Localities from which Typhoid Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
59	St. Clair county: Emmet township (Oct. 10-Nov. 30.)	1	0	St. Clair county: Clyde township (Oct. 17-Nov. 26.)	1	0			
60	St. Clair county: Marine city (June 1-Nov. 30.)	11	5	Sanilac county: Custer township (Sept. 25-Nov. 20.)	12	1			
61	St. Clair county: Port Huron city (Feb. 22-Dec. 31.)	70	7	Sanilac county: Marion township (Dec. 13-Dec. 31.)	1	1			
62	St. Joseph county: Centerville village	*	----	St. Joseph county: Fabius township (Oct. 16-Dec. 1.)	1	0			
63	Tuscola county: Millington village	*	----	Tuscola county: Arbela township (Nov. 30 —.)	2	0			
64	Tuscola county: Unionville village (Aug. —.)	1	1	St. Clair county: Capac village (Oct. 10-Dec. 3.)	3	0			
65	Tuscola county: Vassar village (Aug. 1-Nov. 25.)	4	3	Tuscola county: Arbela township Oct 15-Nov. 16.)	1	0			
				Tuscola township (Sept. 9-Dec. 3.)	3	2			
66	Washtenaw county: Ann Arbor city (— Oct. 19.)	2	2	Wayne county: Van Buren township. (Oct.-Dec. 4.)	2	0			
67	Washtenaw county: Augusta township (Nov. 20—.)	3	0	Wayne county: Sumpter township (Dec 12-Jan. 3,'96.)	1	0			
68	Wayne county: Dearborn township	1	0	Wayne county: Springwells township (Jan. 10-Jan. 19.)	1	1			
69	Wayne county: Detroit city	61	61	Macomb county: Armada township (Mar. 3-Mar. 15.)	1	0			
				Monroe county: Monroe city (Aug. —.)	2	0			
				Wayne county: Hamtramck twp. (Aug. 2-Sept. 8.)	1	0			
				Highland Park village (July 27-Sept. 8.)	1	0			
70	Wexford county: Cadillac city	*	----	Shiawassee county: Owosso city (Sept. 30-Oct. 22.)	4	0			
				Wexford county: Selma township (Aug. 10-Sept. 15.)	1	0			
71	Wexford county	----	----	St. Joseph county: Mendon township (Oct. 15-Jan. 25,'96.)	4	1			
72	Eastern part of Mecosta county.	----	----	Mecosta county: Big Rapids city (June 7-July 18.)	1	0			
73	Northern Michigan	----	----	Tuscola county: Elkland township (Feb. 23-Apr. 11.)	1	0			

* † These foot-notes are on the bottom of the first page of this table.

TABLE 7.—CONTINUED.—*Movement of Infection* Into Michigan *from outside the State.*

Number.†	First Localities from which Typhoid Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
74	Canada	----	----	Delta county: Gladstone city	1	0			
75	Chicago	----	----	Dickinson county: Iron Mountain city (July 15-Jan. 20,'96.)	48	8			
				Jackson county: Rives township (Oct. 23-Nov. 16.)	1	0			
				Van Buren county: Paw Paw village (Oct. 1-Oct. 21.)	1	1			
76	Illinois: Joliet	----	----	Van Buren county: Hartford township (June 20 —.)	6	1			
77	Illinois	----	----	St. Joseph county: Three Rivers city (Sept. 23 —.)	1	0			
78	Indiana	----	----	Cass county: Marcellus village (Oct. 11-Dec. 20.)	4	0			
79	Indiana: Elkhart	----	----	St. Joseph county: Three Rivers city (Sept. 24-Oct. 30.)	6	0			
80	Indiana: Goshen	----	----	St Joseph county: White Pigeon village	1	0			
81	Minnesota: Duluth	----	----	Mecosta county: Millbrook township (Dec. 29 —.)	1	0			
				Ontonagon county: Rockland township: (Sept. 6-Sept. 25.)	1	0			
82	Minnesota: Minneapolis	----	----	Delta county: Gladstone city (Aug. 10 —.)	1	0			
83	Mississippi	----	----	Mecosta county: Millbrook township (Oct. 13-Oct. 24.)	1	1			
84	Montana: Butte city	----	----	Keweenaw county: Sherman township (Mar. 10-Mar. 26.)	1	1			
85	Ohio: Lakeside	----	----	Lenawee county: Hudson city (Sept. —.)	1	0			
86	Ohio: Toledo	----	----	Shiawassee county: Owosso city (Aug. 6-Aug. 20.)	1	1			
				Shiawassee county: Owosso city (Oct. 11-Nov. 5.)	1	0			

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† This foot-note is on the bottom of the first page of this table.

TABLE 7.—CONTINUED.—*Movement of Infection* Into Michigan *from outside the State.*

Number.†	First Localities from which Typhoid Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
87	Ohio	----	----	Clinton county: Maple Rapids village (Nov.-Jan. 9, 1896.)	1	0			
				Gratiot county: Ithaca village	2	0			
				Manistee county: Cleon township (Sept. 29-Oct. 25.)	3	0			
88	Ontario "Soo"	----	----	Chippewa county: Sault St. Marie city (Dec. 10-Jan. 14,'96.)	1	0			
89	Pennsylvania	----	----	Montcalm county: Stanton city (May 11-June 15.)	1	0			
90	Wisconsin	----	----	Allegan county: Heath township (Aug. 8-Sept. 5.)	1	0			
				Cheboygan county: Benton township (Sept. —.)	3	0			
	(Probable *Movement of infection.*)								
91	Eaton county: Eaton Rapids city	*	----	Ingham county: Aurelius township (June 30-Aug 10.)	8	1			
92	Hillsdale county	----	----	Lenawee county: Cambridge township (Oct. 18-Jan. 3, '96.)	2	0			
93	Ingham county: Lansing city (July 13-Feb. 10,'96.)	55	6	Eaton county: Brookfield township. (— July 8)	1	1			
94	Ingham county: Mason city	*	----	Ingham county: Delhi township (Oct. 20-Nov. 20.)	3	2			
95	Kalamazoo county: Kalamazoo city (Jan.-Dec. 22.)	40	7	Kalamazoo county: Richland township (Feb. 1-Mar. 1.)	1	0			
				Macomb county: Mt. Clemens city (Apr. 25-May 26.)	1	1			
96	Lenawee county: Adrian city (Jan.-Dec.)	26	2	Lenawee county: Blissfield village (Mar 28-Apr. 14.)	1	1			
				Tecumseh village (Oct. 8-Nov. 20.)	1	0			
97	Lenawee county: Clayton village	4	1	Lenawee county: Dover township (July-Sept. 28.)	3	0			
98	Lenawee county: Mason township (Aug. 5-Nov. 30.)	1	0	Lenawee county: Clinton village (Nov. 4-Nov. 17.)	1	0			
99	Van Buren county: South Haven village (Sept. —.)	1	0	Kalamazoo county: Ross township (Sept. 27-Jan. 21,'96.)	4	0			

* † These foot-notes are on the bottom of the first page of this table.

TABLE 7.—CONCLUDED.—**Probable** *Movement of Infection.*

Number.†	First Localities from which Typhoid Fever was spread.			Second Localities infected from First.			Third Localities infected from Second.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
100	Washtenaw county: Ypsilanti city (Sept. —.)	3	0	Wayne county: Sumpter township (Nov. 17-Dec. 12.)	1	0			
101	Wayne county: Van Buren township (Oct. 1-Dec. 4.)	2	0	Wayne county: Brownston township	3	3			
	(**Probable** *Movement of Infection* **Into Michigan** *from outside the State.*)								
102	Chicago	----	----	Berrien county: Sodus township (Oct.-Nov.)	1	0			
103	Wisconsin: Milwaukee	----	----	Van Buren county: Geneva township (Aug. 30-Oct. 20.)	7	0			

This foot-note is on the bottom of the first page of this table.

Typhoid Fever Traced to **Former** Cases *in Distant Places.*

On subsequent pages (in paragraphs numbered as in Table 7) are examples of "Typhoid fever traced to **outside of the jurisdictions,**" in which instances the disease was not traced directly to a definite preceding case; the following are representative statements from the reports of some of the health officers, who were able to trace cases of typhoid fever in their respective jurisdictions to cases of the disease outside of their jurisdictions,—with the source of the disease and the name of the health officer, and of his jurisdiction. The numbers preceding the following quotations correspond with similar numbers in Table 7 of this article. The arrangement is alphabetical by counties.

11. "Patient was among the sick * * * her relatives were sick with it at Benton Harbor in September and the first week after she came here was taken sick."—*C. A. Scribner, M. D., Barry Tp., Barry Co.*

20. "Parties from this town calling on sick friends in town of Brookfield" (Eaton Co.)—*James A. Courtright, H. O., Clarence Tp., Calhoun Co.*

23. "From attendance on a sick friend at Petoskey."—*C. H. Johnson, H. O., Boyne Falls, Charlevoix Co.*

29. "Visiting patient sick in Lincoln Tp."—*F. D. McGregor, H. O., Bloomfield Tp., Huron Co.*

48. "Brought from Newaygo County by —— and —— who contracted it while nursing typhoid fever patient in the Tp., of Barton."—*Robert E. Bigbee, H. O., Chase Tp., Lake Co.*

40. "From Riga Tp., attending a case."—*J. M. Barnes, M. D., Blissfield, Lenawee Co.*

18. "A son of the family in an adjoining township (Pickford) having typhoid fever was waited on by his mother, who brought the disease home to her family."—*T. Morrison, H. O., Marquette Tp , Mackinac Co.*

87. "The first patient contracted the disease nursing his brother in Ohio."—*Robert T. Lewis, H. O., Cleon Tp., Manistee Co.*

40. "Was acting as nurse for patient in Riga Tp."—*N. H. Pardon, M. D., Whitefield Tp., Monroe Co.*

63. "Contracted the disease from visiting friends who had fever in Millington."—*Wm. Atkin, M. D., Arbela Tp., Tuscola Co.*

Typhoid Fever Traced to Outside of the Jurisdictions.

On preceding pages are statements of representative instances of the tracing of typhoid fever to definite preceding cases of typhoid fever. The following are extracts from representative reports of health officers, who were able to trace the source of contagium of typhoid fever, in their jurisdictions, to localities outside of their jurisdictions,—with the name of the health officer and the place of his jurisdiction subjoined. The numbers placed before quotations refer to similar numbers in the first column of Table 7. The arrangement is alphabetical by counties.

2. "From Grand Marais."—*John B. Young, H. O., Greenbush Tp., Alcona Co.*

11. "Benton Harbor."—*Samuel Galbreath, H. O., Casco Tp., Allegan Co.*

3. "City of Alpena."—*William Lumsden, H. O., Long Rapids Tp., Alpena Co.*

4. "Brought to our town from Atwood, in Banks Tp."—*D. Blakely, H. O., Torch Lake Tp., Antrim Co.*

5. "A lumber camp in Adams Tp., Arenac Co."—*Tho. H. Hull, M. D., Clayton Tp., Arenac Co.*

11. "Patient was among the sick at Benton Harbor."—*C. A. Scribner, M. D., Barry Tp., Barry Co.*

35. "Drinking water at Grand Rapids."—*W. H. Beattie, Clerk, Orangeville Tp., Barry Co.*

10. "Lady visitor from West Bay City."—*P. J. McGrath, Monitor Tp., Bay Co.*

12. "A family brought from Berrien Springs."—*Lewis W. Ruggles, H O., Hagar Tp., Berrien Co.*

13. "First case was imported from Bronson."—*S. H. Clizbe, M. D., Coldwater, Branch Co.*

18. "First two cases contracted the disease in Indiana."—*F. Shillito, M. D., Marcellus, Cass Co.*

23. "From persons coming from Petoskey."—*E. R. Boynton, H. O., Bay Tp., Charlevoix Co.*

90. "Contracted in the State of Wisconsin."—*T. H. McKervey, M. D., Cheboygan.*

87. "Brought here from Ohio, where father died of same disease."—*A. O. Hart, M. D., Maple Rapids Village, Clinton Co.*

31. "The disease was brought from Portland."—*J. Schoenith, H. O., Westphalia Tp., Clinton Co.*

45. "Patient contracted the disease at Greenville, Montcalm Co."—*Mark S. Dilley, H. O., Frederic Tp., Crawford Co.*

26. "From Ashley, Mich."; and 82. "From Minneapolis."—*C. A. Chase, M. D., Gladstone, Delta Co.*

28. "Man working in lumber camp (Duncan Tp., Houghton County) took sick and came here for treatment, second took sick at same place."—*M. F. Dockery, M. D., Sagola Tp., Dickinson Co.*

23. "It was a case brought from Harbor Springs."—*J. E. Rankin, M. D., Petoskey.*

6. "From the township of Au Gres, Arenac Co."—*A. H. Coddington, M. D., Thetford Tp.. Genesee Co.*

56. "Came from Owosso."—*G. A. Lingiman, M. D., Ithaca, Gratiot Co.*

8. "Contracted in the village of Baraga."—*E. B. Nelson, M. D., Chassell Tp., Houghton Co.*

30. "Came from Elkton (Huron Co.)."—*F. W. Sellars, M. D., Meade Tp., Huron Co.*

57. "Came from Durand (Shiawassee Co.)."—*Henry Tremayne, M. D., Ionia.*

32. "From a young lady working in the city of Mt. Pleasant."—*Henry Lorenz, H. O., Nottawa Tp., Isabella Co.*

75. "Came here from Chicago."—*Geo. H. Townsend, M. D., Rives Tp., Jackson Co.*

34. "From an infected neighborhood in the city of Kalamazoo, one being brought here sick."—*O. F. Seeley, M. D., Climax Tp., Kalamazoo Co.*

35. "Patient came home from Grand Rapids."—*A. G. Graybiel, M. D., Caledonia Tp., Kent Co.*

38. "Contracted the disease at Clifford."—*Peter Stewart, M. D., Hadley, Lapeer Co.*

57. "Contracted the disease at Durand."—*Wm. H. Erwin, M. D., Cohoctah Tp., Livingston Co.*

69. "Brought from Detroit."—*Chas. H. Lincoln, M. D., Armada Tp., Macomb Co.*

58. "From Columbia Tp. (St. Clair Co.)."—*E. B. Keeler, M. D., Richmond, Macomb Co.*

8. "An imported case, sent from Baraga."—*E. B. Patterson, M. D., Michigamme Tp., Marquette Co.*

83. "Disease was contracted in Mississippi."—*E. W. Fogelsong, Pres., Millbrook Tp., Mecosta Co.*

81. "Duluth, Minnesota."—*Charles P. Doyle, M. D., Millbrook Tp., Mecosta Co.*

32. "From Mt. Pleasant."—*H. C. Burson, M. D., McBain, Missaukee Co.*

69. "Came from Detroit."—*W. F. Knapp, M D., Monroe.*

89. "He came here to visit brother, from Pennsylvania and was taken sick;" and

44. "Brought from the township of Douglas by a lady from our city."—*Allen L. Covey, M. D., Stanton.*

47. "Came from Wheatfield, been drinking lake water."—*G W. DeClements, M. D., Briley Tp., Montmorency Co.*

49. "He was taken sick while working in a swamp in the township of Hart."—*H. L. Hodges, H. O., Elbridge Tp., Oceana Co.*

51. "Patient came here sick from Ontonagon."—*W. C. Gates, M. D., Rockland Tp., Ontonagon Co.*

81. "Party was brought here sick with it from Duluth, Minn."—*W. C. Gates. M. D., Rockland Tp., Ontonagon Co.*

53. "Patient moved into my jurisdiction from Holland Tp."—*Wm. J. J. Bruinsma, M. D., Olive Tp., Ottawa Co.*

60. "Contracted the disease at Marine City."—*David C. Borden, H. O., Custer Tp., Sanilac Co.*

61. "The young lady had been sojourning at Port Huron and came home sick with the disease."—*G. C. Vincent, M. D., Marion Tp., Sanilac Co.*

56. "First case was from St. Charles (Saginaw County), and was from bad water."—*C. A. Osborn, M. D., Owosso.*

86. "Had been in Toledo, Ohio, for six weeks, came home sick," and "Also came from Toledo, Ohio." —*C. A. Osborn, M. D., Owosso.*

70. "Came from Cadillac here sick."—*C. A. Osborn, M. D., Owosso.*

15. "Was taken sick in Battle Creek, came home for treatment."—*Geo. W. Chrouch, M. D., Woodhull Tp., Shiawassee Co.*

34. "The first case was brought here while sick, from the Asylum at Kalamazoo."—*B. P. Scoville, M. D., Constantine, St. Joseph Co.*

27. "From Hillsdale."—and—80. "From Goshen, Indiana."—*T. C. Buskirk, M. D., White Pigeon, St. Joseph Co.*

39. "From Adrian."—*F. K. Owen, M. D., Ypsilanti.*

69. "One case came from city (Detroit)."—*A. Stewart, M. D., Hamtramck Tp., Wayne Co.*

69. "Brought from the city (Detroit)."—*A. Stewart, M. D., Highland Park, Wayne Co.*

68. "Patient was taken sick in Dearborn Tp."—*F. J. Clippert, M. D., Springwells Tp., Wayne Co.*

75. "Patient acquired the disease in Chicago."—*Wilbur F. Hoyt, M. D., Paw Paw, Van Buren Co.*

24. "One moved in from Flint."—*Wm. Atkin, M. D., Arbela Tp., Tuscola Co.*

65. "One case contracted in Vassar."—*Wm. Atkin, M. D., Arbela Tp., Tuscola Co.*

9. "From Bay City."—*N. McClenton, M. D., Cass City, Tuscola Co.*

65. "It was brought from Vassar into my jurisdiction."—*Fred Johnson, M. D., Tuscola Tp., Tuscola Co.*

66. "The first patient came home sick from Ann Arbor."—*B. Arnold, M. D., Van Buren Tp., Wayne Co.*

September 14, 1895, an outbreak of typhoid fever was reported in Geneva Tp., Van Buren Co., which lasted from Aug. 30, to Oct. 20, 1895, and which resulted in 7 cases and no deaths. Relative to the source of contagium of the outbreak, the health officer, N. S. Taylor, wrote to this Office on Nov. 4, 1895, as follows:—

> "The case of typhoid fever spoken of heretofore, brought from Milwaukee, slept in a foul bed in the city and then went aboard a vessel, slept in the hold where it was exceedingly filthy, in a bunk which had been occupied by a sick man left on shore, came home sick, house disinfected and all other care taken. (Result)—Seven have come down in immediate vicinity or in same house."

Outbreaks Attributed to Infected, Contaminated or Impure Water.

The following are extracts from reports by a few of the health officials, who attributed the cause of 1,163 cases of typhoid fever, in their jurisdictions, to infected, contaminated, impure, or surface water,—with the name of the health officer (or other health official) and the name of the jurisdiction subjoined:—

"Bad water."—*J. W. Ferguson, H. O., Curtis Tp., Alcona Co.*

"No. 1, impure water; No. 2, same; No. 4, bad water from leachings of outhouses."—*C. S. Norton, M. D., Gustin Tp., Alcona Co.*

"Contaminated water supply."—*W. D. Wylie, H. O., East Jordan Tp., Antrim Co.*

"Low water in wells."—*W. H. Hasty, H. O., Adams Tp., Arenac Co.*

"Low water in swamps, both cases were brought here from the same camp 15 miles distant."—*Frank E. Abbott, M. D., Deep River Tp., Arenac Co.*

"Impure water."—*E. C. Warren, M. D., Standish, Arenac Co.*

"From bad water supply and filth of surrounding premises."—*F. G. Sheffield, M. D., Baltimore Tp., Barry Co.*

"Drinking water at Grand Rapids."—*W. H. Beattie, Clerk, Orangeville Tp., Barry Co*

"Using water from low shallow well and rotting potatoes in cellar."—*D. B. Kilpatrick, M. D., Woodland Tp., Barry Co.*

"Through low water in wells "—*Harry J. Garber, M. D., Essexville, Bay Co.*

"Impure drinking water."—*H. J. Kinnie, M. D., Crystal Lake Tp., Benzie Co.*

"Use of impure ice."—*D. W. Percell, H. O., Stevensville, Berrien Co.*

"From bad water supply."—*S. B. Frankhauser, M. D., Union City, Branch Co.*

"Low water caused by draining Turtle lake."—*Harry Barton, H. O, Burlington Tp., Calhoun Co*

"Drinking water."—*T. H. Bull, Clerk, Marshall Tp., Calhoun Co.*

"By impure water."—*John L. Randal, M. D., Tekonsha, Calhoun Co.*

"Contaminated water."—*J. L. Robinson, M. D., Calvin Tp., Cass Co.*

"Use of impure water."—*W. C. McCutcheon, M. D., LaGrange Tp., Cass Co.*

"Impure water."—*H. M. Hampton, Clerk, Wayne Tp., Cass Co.*

"Impure water supply from St. Mary's river."—*W. B. House, M. D., Detour Tp., Chippewa Co*

"Drinking of impure water."—*Samuel Daggett, H. O., Grant Tp., Clare Co.*

"From bad water in a well."—*A. O. Hart, M. D., Maple Rapids, Clinton Co.*

"From drinking water."—*H. Palmer, M. D., St. Johns, Clinton Co.*

"Through water of a well on the premises where a case of typhoid fever existed one year ago."—*John B. Brasseur, M. D., Norway, Dickinson Co.*

"In my opinion was caused by bad water owing to the water being so low in the wells."—*H. D. Hull, M. D., Bellevue Tp., Eaton Co.*

"Impure water, a new well."—*J. W. Clements, H. O., Chester Tp., Eaton Co.*

"I believe due to low water in wells."—*L. C. Jones, M. D., Kalamo Tp., Eaton Co.*

"Caused by bad water."—*K. Emmett Flood, M. D., Harbor Springs, Emmet Co.*

"From contaminated water."—*L. W. Gardner, M. D., Little Traverse Tp, Emmet Co.*

"Most of the cases were caused by using well water."—*J. E. Rankin, M. D., Petoskey, Emmet Co.*

"By drinking impure water from a small lake and a low well "—*A. H. Coddington, M. D. Thetford Tp., Genesee Co.*

"Low water in well."—*J. Murphy, M. D., Sherman Tp., Gladwin Co.*

"Reported as being impure creek water "—*E. J. Taylor, H. O., East Bay Tp., Grand Traverse Co*

"From the low stage of the water."—*C. J. Kneeland, M. D., Traverse City.*

"Poor drinking water."—*J. F. Suydam, M. D, Arcada Tp., Gratiot Co.*

"From low water in wells."—*G. A. Lingiman, M. D., Ithaca, Gratiot Co.*

"Due to the low stage of water in the well."—*G. W. Petty, M D., St. Louis, Gratiot Co.*

"Drank water from a spring that was low, also drank water from a well that was low."—*W. A. Oliver, M. D., Camden Tp., Hillsdale Co.*

"From bad water."—*J. W. Niblock, M. D., Reading Tp., Hillsdale Co.*

"Low water in wells."—*J. S. Corcoran, M. D., Bingham Tp., Huron Co.*

"At home from the use of bad drinking water."—*F. H. Storbeck, H. O., Hume Tp., Huron Co*

"Infected well from privy."—*Otto Frenzel, M. D., Windsor Tp., Huron Co.*

"It is my opinion it was caused from impure drinking water."—*Theodore Cole, M. D., Lansing*

"Poor drinking water."—*F. N. Turner, M. D., Leroy Tp., Ingham Co.*

"Impure water."—*Geo. D. Spencer, M. D., Lock Tp., Ingham Co.*

"Bad water."—*J. S. Norris, M. D., Belding, Ionia Co.*

"Bad water."—*Wm. Bell, M. D., Otisco Tp., Ionia Co.*

"Doubtless bad water."—*Fred C. Thompson, M. D., East Tawas, Iosco Co.*

"On account of bad water."—*B. M. Long, H. O., Grant Tp, Iosco Co.*

"Impure water."—*E. H. Thompson, H. O., Reno Tp., Iosco Co.*

"Bad water "—*J. A. Jackson, (Supervisor) Sherman Tp., Iosco Co*

"Germs in water."—*Henry Lorens, H. O., Nottawa Tp., Isabella Co.*

"From drinking impure water."—*O. B. Thayer, H. O., Vernon Tp., Isabella Co*

"By impure water from the well."—*L. M. Jones, M. D., Brooklyn, Jackson Co*

"Bad water."—*W. S. Culver, Sup'r., Columbia Tp., Jackson Co.*

"Patient drank water from Grand River at Grand Rapids fair ground and was subsequently taken sick at Concord."—*M. L. Bacon, M. D., Concord, Jackson Co.*

"Impure drinking water."—*A. Hockstein, M. D., Kalamazoo.*

"From the water."—*Henry A. Bacon, Clerk, Portage Tp., Kalamazoo Co.*

"From local water supply, caused by low water during the summer."—*F. S. Coller, M. D., Vicksburg, Kalamazoo Co.*

"Drinking impure water."—*Wm. R. Fuller, H. O., Springfield Tp., Kalkaska Co.*

"Contracted by water from a well."—*O. C. Taylor, Pres. Grandville, Kent Co.*

"By using impure drinking water."—*Wm. F. Adams, H. O., Paris Tp., Kent Co.*

"Using water of long standing in barrels, drawn in August from river."—*C. A. Buddington, H. O., Attica Tp., Lapeer Co.*

"Low water in wells."—*Geo. W. Jones, M. D., Imlay Tp., Lapeer Co.*

"Use of well water."—*J. V. Frasier, M. D., Lapeer Co.*

"Low water in wells."—*S. A. Snow, M. D., North Branch, Lapeer Co.*

"From drinking water."—*O. C. Joslin, M. D., Sutton's Bay Tp., Leelanaw Co.*

"Contamination of city water supply."—*F. E. Andrews, M. D., Adrian.*

"Bad well water."—*Wm. H. Erwin, M. D., Cohoctah Tp., Livingston Co.*

"From drinking impure water in an adjoining township."—*Alex. Gunn, M. D., Lenox Tp., Macomb Co.*

"Developed at home where water and nourishment were poor."—*E. B. Keeler, M. D., Richmond, Macomb Co.*

"Poor water."—*M. S. Howes, H. O., Marilla Tp., Manistee Co.*

"Typhoid fever cases, with one exception, drank water from open wells."—*W. A. Whitney, M. D., Big Rapids, Mecosta Co.*

"Caused by impure water."—*A. M. Buck, H. O., Martiny Tp., Mecosta Co.*

"Impure water."—*E. Wilson, H. O., Mecosta Tp., Mecosta Co.*

"Drinking of impure water."—*C. Fries, M. D., Edenville Tp., Midland Co.*

"Use of impure water."—*Milton Boies, H. O., Midland Tp., Midland Co.*

"Impure water, proximity of cemetery."—*D. McAlpine, M. D., Reeder Tp., Missaukee Co.*

"By impure water."—*S. A. DuPaul, M. D., Ash Tp., Monroe Co.*

"Poor drinking water."—*Geo. R. Canen, M. D., Bedford Tp., Monroe Co.*

"Was due to the low condition of water."—*B. A. Tracy, M. D., Ida Tp., Monroe Co.*

"From bad water."—*N. H. Pardon, M. D., Whiteford Tp., Monroe Co.*

"Supposed to be using bad water from an old well."—*C. A. Carle, M. D., Douglas Tp., Montcalm Co.*

"Impure drinking water."—*Alanson McComb, H. O., Evergreen Tp., Montcalm Co.*

"By drinking impure water."—*James Totten, M. D., Howard City.*

"Came from Wheatfield Tp., been drinking lake water."—*G. W. DeClements, M. D., Briley Tp., Montmorency Co.*

"Impure water."—*Thos. Dorman, H. O., Laketon Tp., Muskegon Co.*

"Drinking bad water from well."—*Eugene C. Morey, H. O., Sullivan Tp., Muskegon Co.*

"From the use of impure water."—*Fred B. Cushman, Clerk, Ensley Tp., Newaygo Co.*

"Impure water and unsanitary surroundings."—*J. J. Kittredge, M. D., Crystal Tp., Oceana Co.*

"Drying up of low lands in immediate vicinity and low water in shallow wells."—*A. M. Spaulding, M. D., Shelby Tp., Oceana Co.*

"Impure water."—*R. S. Buckland, M. D., McMillan Tp., Ontonagon Co.*

"Through drinking water from well on the low grounds."—*James P. Jordon, M. D., Ontonagon, Ontonagon Co.*

"From poor water."—*Wm. W. Smith, H. O., Sylvan Tp., Osceola Co.*

"From well-water."—*A. S. Peterson, M. D., Mentor Tp., Oscoda Co.*

"Drinking water."—*Wm. J. J. Bruinsma, M. D., Olive Tp., Ottawa Co.*

"Using water from an old well."—*Wm. Kremer, H. O., Buena Vista Tp., Saginaw Co.*

"Through low well water."—*F. Norwood Jeffery, M. D., Chapin Tp., Saginaw Co.*

"Low water in well."—*Frank Morrison, M. D., Maple Grove Tp., Saginaw Co.*

"From surface-water wells."—*E. E. Curtis, M. D., Saginaw, W. S.*

"Impure drinking water."—*Chas. W. Ellis, Jr., M. D., Saginaw, E. S.*

"Dry hot weather and contaminated water."—*D. D. McNaughton, M. D., Argyle Tp., Sanilac Co.*

"Bad water,—hole in the ground called a well."—*H. B. Burt, H. O., Greenleaf Tp., Sanilac Co.*

"From low water in wells and decomposed vegetable matter, such as decaying wood and burning muck."—*Geo. S. Tweedie, M. D., Watertown Tp., Sanilac Co.*

"Was caused by low water."—*A. Trowbridge, M. D., Antrim Tp., Shiawassee Co.*

"By bad drinking water."—*W. H. Pitts, H. O. Rush Tp., Shiawassee Co.*

"To the best of my knowledge it was caused by low water in well and by having well too close to barnyard."—*Henry Isbister, H. O., Kenockee Tp., St. Clair Co.*

"From drinking impure water."—*Isaac P. Green, H. O., Wales Tp., St. Clair Co.*

Outbreaks of Typhoid Fever Attributed to Defective Drainage or Sewerage, Filth or Unsanitary Conditions, Colds, Etc.

The following are a few extracts from reports of health officials, with the names and jurisdictions subjoined, relative to cases of typhoid fever attributed to defective drainage or sewerage, unsanitary conditions, etc.

Outbreaks Attributed to Defective Sewerage and Drainage.

"Drinking water contaminated by sewage."—*C. D. Pullen, M. D., Mt. Pleasant, Isabella Co.*

"Surface water drawn into well in a badly-conducted lumber camp."—*C. L. Nauman, M. D., West Branch, Ogemaw Co.*

"Low water and drainage of the garbage works situated at Belleville, and settled in the mouth of the Huron River."—*A. W. Wagar, H. O., Brownston Tp., Wayne Co.*

"Impure water, bad drainage, and unhealthy condition of the house."—*J. E. Howe, M. D., Dearborn Tp., Wayne Co.*

In an outbreak of typhoid fever in Clare, Clare Co., which continued from August 10 to December 7, 1895, and resulted in 11 cases and 1 death, the health officer, P. E. Witherspoon, M. D., seems to trace the contagium to the infection of the water in the wells, which may be attributed to the defective drainage and the total absence of sewerage. In a letter dated, Sept. 17, he says:

"The causes of typhoid fever are in my opinion due to the fact that there is *very poor general sanitation.* Through the east and south part of the town runs a slow, meandering brook filled with seepings from barns and vaults, etc. On the west and north of town the Tobacco River is dammed for mill purposes and the overflow covers many acres of made earth, decaying logs, etc. The wells are shallow, 16 to 30 feet in loose sandy soil and I think they are more or less at fault. The water undoubtedly low during the summer as we have *had very little rainfall,* but we have in no case had more than one case in a family."

In a letter of Nov. 22, Dr. Witherspoon states that the city of Clare has no sewers and after emphasizing the statement in his previous letter, relative to the condition of the two streams, he says:

"The water supply for the city is taken from wells near said creek and lower than the bed of the stream, and when water is low, water is taken from said creek which is the natural drainage of the surface water of the town. The brook is very unsanitary. The people are very careless about cleaning up and making new vaults."

Outbreaks Attributed to Filth and Unsanitary Conditions.

"Animal waste near slaughter place."—*A. B. Conklin, M. D., Cassopolis, Cass Co.*

"This house was used about a year ago by a feather renovator and the under part of the house as a hen house."—*J. F. Suydam, M. D., Alma, Gratiot Co.*

"Water closet at station needed cleaning and R. R. company neglected to attend to same during hot weather."—*J. A. Turner, M. D., Webberville, Ingham Co.*

"From unsanitary condition at home."—*L. F. Van Amberg, M. D., Ada Tp., Kent Co.*

"Came from bad hygienic surroundings."—*John Greenshields, M. D., Romeo, Macomb Co.*

"Due to boiling potatoes and filth."—*Q. A. Eaton, M. D., Amber Tp., Mason Co.*

"Unsanitary surrounding."—*Francis Wright, H. O., McBain, Missaukee Co.*

"Poor drinking water, and in some cases also, bad sanitary conditions."—*Geo. Canen, M. D., Bedford Tp., Monroe Co.*

"Unwholesome premises."—*Duane E. Briggs, H. O., Dalton Tp., Muskegon Co.*

"From filthy surroundings."—*Albert T. Wightman, H. O., Barton Tp., Newaygo Co.*

"Impure water and unsanitary surroundings."—*J. J. Kittredge, M. D., Crystal Tp., Oceana Co.*

"I think from decaying vegetables around the house."—*Hugh Fenton, H. O., Worth Tp., Sanilac Co.*

"Probably from wells and filthy habits."—*A. J. Abbott, M. D., Emmet, St. Clair Co.*

"Supposed cause was a cistern under the house."—*Isaac P. Green, H. O., Wales Tp., St. Clair Co.*

"Stagnant water in cellar."—*J. W. B. Fort, M. D., Mottville Tp., St. Joseph Co.*

"From privy within forty feet of well and well under stoop of dwelling."—*Wm. Atkin, M. D., Arbela Tp., Tuscola Co.*

"From filth and bad water, chickens were kept under the living room."—*James Hawthorn, H. O., Clam Lake Tp., Wexford Co.*

"Originated from a hole dug near the house filled with general house refuse, it was open to bank the house."—*S. C. Hayward, Sup'r., Ingalston Tp., Menominee Co.*

An outbreak of typhoid fever in Vevay Tp., Ingham Co., which began Sept. 1 (the date of the ending is not given) and which resulted in 3 cases, seems to have been traced to an unsanitary house. The first notice of the outbreak was in the "Local Republican," published at Leslie, and of date, Sept. 27, 1895. A "Blue Letter" was sent to Joseph Jewett, Health Officer of Vevay Tp., on October 2, and on October 5 a weekly report was received from that official, which stated relative to the source of contagium, as follows:—

"I have investigated the cause of the outbreak of typhoid fever in F—— R——'s family. V—— R—— was taken sick four weeks ago. They had in the house typhoid fever four years ago. and the mother said that she got out some underwear that a child had worn at that time. last spring, and put on the little girl that was sick. (Had not been worn for four years.) Get their drinking water from a new rock well, water in their well is bad, they do not use it. There was no disinfectant used four years ago.'

October 8, the Secretary of this Board wrote to Health Officer Jewett as follows:—

"Your statement on the back of the report is very interesting indeed, and I would be very glad to know just how long the little girl wore the underclothing before she was taken sick.

"You say 'the water in their well is bad, but that they do not use it.' Perhaps the little girl may have obtained a drink of the water without the parents knowing about it, and I think it would be well for you to question the parents and the little girl very closely about it. I would also like to know whether the little girl was away from home before being taken sick, as she may have drank water from some other well, say about ten days or two weeks before being taken sick."

Health Officer Jewett answered the above-quoted letter on Oct. 19, and in answer to the questions therein, stated as follows:—

"I have questioned the parents of V—— R—— whether she drank water away from home previous to her being sick. They said she had. She has worn the underclothing all the fore part of the summer and has been poorly all summer. She has now passed her 44 days of fever, and is not much better. There has been fever in the house every year for the past eight years, two having run its full course, and the other cases having been broken up.

"The mother said that there was an old cistern under the kitchen that has not been used in ten years or more, or even looked to. I advised her to fill up the cistern, and use disinfectants. They are now using them about the house and cellar."

Outbreaks of Typhoid Fever Attributed to Overwork, Exposure, Etc.

"Probably from overwork."—*Geo. N. Porter, H. O., Richfield Tp., Genesee Co.*

"Dissipation and exposure."—*David B. Henley, H. O., Atkinson Tp., Iron Co.*

"Hard work, out early and late."—*John H. Letherby, H. O., Clearwater, Kalkaska Co.*

"We think through impure drinking water. In case No. 2, well was open and water had to be strained."—*W. C. Hontz, M. D., Leonidas Tp., St. Joseph Co.*

"From low water in shallow well."—*E. B. Stone, H O., Augusta Tp, Washtenaw Co.*

"Low water in wells."—*Christian O Kelly, Clerk, Ypsilanti Tp., Washtenaw Co*

"Drinking water which became infected up the river at Detroit."—*W. W. Bowers, M. D., Ecorse Tp., Wayne Co.*

"Through impure water drawn from a distance and deposited in a well at residence then used as needed."—*J. S. Dohany, M. D., Greenfield Tp., Wayne Co.*

"Low water in the wells."—*J. E. Maxwell, M. D., Decatur, Van Buren Co.*

"Impure drinking water."—*R. L. Tibbitts, Clerk, Fairgrove Tp., Tuscola Co.*

In an outbreak of typhoid fever in Marcellus, Cass Co., which resulted in 4 cases, and continued from Oct. 11, to Dec. 20, 1895, two of the cases were reported as having come from Indiana already infected with the disease. Relative to the source of contagium of the two cases, Fred Shillito, M. D., Health Officer, wrote:—

"They had been visiting in northern Indiana and had come home Sept. 23, 1895. Typhoid fever was in the neighborhood where they visited but not in the family that they were visiting. The one aged 2 years was taken sick Oct. 8, and the one aged 7 was taken sick Oct. 14. They reported that the water was not good where they were staying, and their mother said it made her sick to drink it."

The health officers of each of the three localities, Inverness Tp., Mackinaw city and Munroe Tp., in Cheboygan County reported from each of their respective jurisdictions one outbreak of typhoid fever, with a total result of 15 cases and 1 death, and the source of contagium in each instance was reported as "bad water."

Concerning three outbreaks in the city of Marquette, which resulted in 84 cases and 4 deaths, Dr. Harkin, in reporting relative to the source of contagium, says:—

(1.) "City water supply."
(2.) "From lumbering camps, where patients drank swamp water."
(3.) "City water supply."

In an outbreak of typhoid fever in Troy Tp., Oakland county, which lasted from November 20, 1895 to Jan. 10, 1896, and resulted in 5 cases and 2 deaths, the health officer, James W. Anderson, M. D., reported to this Office that the source of contagium, was as follows:—

"Water from a flowing well was dammed up by the roadside and became foul from use as a goose pond. Patients used water from surface well, which apparently received the sewerage from this pond."

Typhoid Fever at Iron Mountain.

The outbreak of typhoid fever at Iron Mountain, causing 48 cases and 8 deaths, and continuing from July 11, 1895, to Jan., 1896, was first reported to this Office by the health officer Joseph A. Crowell, M. D., on an "L" blank, July 15, 1895.

Relative to the causes of contagium and the development of the outbreak, in a letter dated August 20, 1895, Dr. Crowell says:—

"We have had at Iron Mountain, since July 17, ten cases of typhoid fever reported with two deaths. One of these cases was a sudden death, 24 hours after a prolonged severe chill, during which interval a premature labor took place, typhoid fever was unexpected until an autopsy revealed the ulceration of the ilium with large perforation at one point. Of these ten cases, the first comes here sick from Chicago and although far more than usually cautious, a second case developed in this home three weeks later although the water was safe and the discharges, bedding and dishes were all disinfected. Of the other eight cases, four came from out of town and four were drinking well water. Two from a well which supplied a R. R. tank house; and the enclosed copy of letter sent the local agent here will explain itself. Since the receipt of the same the R. R. has ordered all train men and employés to refrain from the use of this water.

"Some of our cases in boarding houses use the sewer water-closets, and although all the discharges are ordered disinfected and the disinfectants purchased by the city, still it may be often carelessly done thus goes into the public sewer which empties into an open sewer one mile below the city and from this stream cows habitually drink. I have tried to have the city fence this stream, but our city fathers do not think it a source of danger. The little brook is foul smelling with sewer matter, and even if there is no danger from what they may drink, this infected water is splashed up upon the cows and to me it appears certainly a possible source of infection. I would like to hear from you in the matter."

The Health Officer of Iron Mountain enclosed the copy of a letter which he had sent to the local agent of the Chicago, Milwaukee & St. Paul R'y Co., which is self-explanatory and which shows some of the conditions, and the efforts which were made to restrict the spread of the disease. The copy of the letter was as follows:—

"Two cases of typhoid fever that have lately developed in the city can be traced almost to a certainty to the use of water taken from the tank at your station and upon investigation the conditions are such as to almost preclude the possibility of your ever having water safe for drinking from this ground. Your well is a large one in a sandy district from which is pumped daily about 15,000 gals. of water and necessarily drains a large area. The present depot water closet, a common vault, is located within thirty-five feet of the well, and a second closet, in use until about a year ago but now filled in, was located within fifty feet from this same well. I find that local employés are drinking this water and that train men also drink it from tender tanks, and that not infrequently the tanks in coaches are filled with this water, making the possibility of scattering typhoid fever from this source almost beyond computation.

"Please call attention of your people to this matter without delay, and pending any permanent arrangements for supplying safe water for drinking purposes, please prohibit its use for such as far as possible. I will publicly warn all persons from drinking this water by posting notices about the tank house."

In the absence of Secretary Baker, a letter was sent to Dr. Crowell, on August 31, suggesting thorough boiling of the water, and the complete disinfection of excreta, and at the same time several copies of the pamphlet on the restriction and prevention of typhoid fever, were sent. On Dr. Baker's return he wrote to Health Officer Crowell, as follows:—

"I believe as you do that the cows should not be permitted to go into or drink the sewage-contaminated water, as there is probably no doubt but the water below Iron Mountain is badly contaminated. It is dangerous because there is no telling just when the udder of a cow may become infected and the milk may become infected with the typhoid-fever bacillus."

October 14, 1895, Dr. Crowell again wrote to this Office, suggesting the possibility of infection from typhoid fever through some other channel than the alimentary canal, and asking information relative to destroying a suspected pump. A portion of his letter was as follows:—

"One case contracted it while nursing a patient although far more than usually careful and through some other medium than the water. Has the board of health the power to destroy a private well, however strongly they may suspect its being contaminated? Is a private well at any time a public nuisance?"

October 16, the Secretary of this Board again wrote Dr. Crowell, in answer to his questions. After referring Dr. Crowell to the law on the subject, he said:—

"I believe a private well may be, and if infected is *usually* a public nuisance.

"I think the board of health has power to order its use discontinued, and to enforce the order although if the water is boiled it is safe to use."

Bacteriological examination should be made of all water suspected of contamination by the typhoid fever bacillus.

The necessity of bacteriological analysis of water suspected of contamination by the typhoid fever bacillus has been urged by this Office in all instances where questions concerning possibly contaminated wells or other water supply have been asked. The following correspondence between S. W. Corwin and this office seems to cover the ground of questions asked and the answer by the secretary of this Board is sufficiently broad to cover any similar cases.

Feb. 11, 1895, Mr. S. W. Corwin wrote the secretary of this Board from Grass Lake, making inquiry as to the methods of analysis of suspected water, as follows:

"Will you kindly inform me if there is any way except by analysis, of ascertaining the presence of organic matter in well water.

"My well is only about thirty feet from privy vault though the surface of soil naturally slopes in that distance about two feet, from the well.

"I have had no cause to suspect impure water but believe it to be in too close proximity to danger, and I wish to ascertain if possible the exact conditions."

Secretary Baker's answer to these questions, dated Feb. 12, 1895, was as follows:

"I know of no sure way to ascertain the presence of organic matter in well water except by some sort of an analysis; but a chemical analysis does not yield the information needed relative to the presence of the specific cause of disease. Water may contain organic matter and not any disease germs. On the other hand, water may contain disease germs and yet not sufficient organic matter so that a chemical analysis shall show a probability of danger.

"If you wish either a chemical or bacteriological examination of the water, I would advise you to apply to Prof. V. C. Vaughan, Director of Laboratory of Hygiene, Ann Arbor. He will probably do it at cost, which will probably be about ten dollars per sample. From your letter I should say it would be safest to boil the water before it is drank. This would be much safer than relying on any analysis, because although the water may be free from germs today, it may not be free a week from now. The principal disease due to impure water is typhoid fever."

Typhoid fever in Michigamme, believed to have been brought from Baraga.

In an outbreak of typhoid fever in Michigamme, Marquette Co., which resulted in four cases, and commenced Nov. 18, the source of contagium seems to be plainly traced to a case from outside the jurisdiction, which was brought into Michigamme, and which probably caused the contamination of the water-supply at the premises where it was located. E. B. Patterson, M. D., Health officer of Michigamme wrote to this office on Dec. 1, 1895, as follows:

"I wish to report an outbreak of typhoid fever.

Mrs. Wm. ———, Nov. 18th., age 25 yrs.
A——— B———, Nov. 21st., age 4 yrs.
N——— D———, Nov. 28th., age 5 yrs.

"The D——— and B——— families live about 25 ft. apart but isolated from other families. Their houses are on the slope of a hill about 300 ft. from Lake Michigamme. The character of the soil, is a coarse gravel down to the ledge of granite dipping to the lake basin. Their water supply is from a well used in common and situated between and in front (toward the lake) of them. B——'s privy is about 50 feet up the hill from their house and is 145 distant from the well and about 12 feet above it in elevation. The privy is a pit dug 4 or 5 ft. into the gravel. The well is 30 feet deep, sunk to the ledge and into it for a retaining basin.

"One month ago today Mrs. B—— went to Baraga to see her daughter, who, with her husband, are sick with enteric fever. A child three years old had also had the fever but was pronounced by the attending physician to be well. Mrs B——, therefore, brought the child home with her. Upon inquiry I find that for two weeks after the coming here of the child, it had a diarrhea, was feverish and petulant and manifested other characteristic symptoms of the enteric fever of childhood, in fact, the child seemed hardly well yet. The stools from this child were thrown undisinfected into the privy. The conclusion is of course obvious, the contents of the privy become infected and sinking into the ground until the ledge was reached, went directly into the well. The weather being cold most of the time probably not a great quantity reached the well, and the fact that the cases resulting therefrom are only mild is further proof of a theory that I have long entertained that other things being equal the severity of a given case is in exact ratio to the amount and intensity of the poison ingested. I have no doubt but that if the well were to be used until warm weather when the washing from the privy would find freer escape and the level of the well be lower, that cases of extreme virulence would arise. I have ordered the well abandoned and it will be filled up.

"I have reported the cases at length, as the causation seems very definite, and also to emphasize the fact long ago pointed out by bacteriologists, that the poison still exists in the stools and these stools are infectious long after apparent recovery, and that as physicians and health officers we should be more cautious in allowing these cases to escape from our notice and care so easily.

"The certainty in these cases is strenghthened by there having been no fever here this year."

TYPHOID FEVER IN EVERETT TP., NEWAYGO CO.

Isolation and disinfection neglected—The Public-Health Laws disobeyed—Contaminated water—Difference of diagnosis.

An outbreak of typhoid fever in Everett Tp., Newaygo Co., causing 15 cases and 3 deaths, and lasting from some time in August, 1895, to March, 1896, was first reported by Daniel Crofoot, Clerk, on Nov. 12, 1895. Information as to the exact condition of the outbreak was, as usual, immediately asked of the health officer, who replied promptly, expressing his willingness to give the matter attention and stating that up to that time, about four months after the first cases in the outbreak, he had not received reports of "a single case" from householders or physicians; although, there seem to have occurred at least 12 cases and 2 deaths.

The history of this outbreak according to the reports of the investigations by the health officer, and the various causes and results at different stages of its course are methodically arranged in the correspondence between this Office and the Health Officer of Everett Tp. All the evidence seems to show that the extent of the outbreak was due to the neglect of isolation and disinfection, perhaps contributed to by mistaken diagnosis, to ignorance in one instance, and to an unmistakable disobedience in another, of the Public-health Law which makes it compulsory on the part of householders and physicians to report to the health officer, in cases of dangerous communicable diseases. In one of these instances, every disobedience of the rules of the State Board of Health, or the Public-health Law, was followed by disastrous results.

Following the letter from Eli Cool, Health Officer of the Township, promising to investigate the outbreak, a letter was sent from this Office informing him of Act 158, Laws of 1895, which makes the reports by householders and physicians compulsory, and suggesting that proper steps be taken to compel the reports under that law.

Health Officer Cool wrote to this Office Dec. 3, 1895, giving many of the details of the outbreak. Portions of his letter were as follows:—

"With regard to the outbreak and spread of typhoid fever in this township (Everett) will say it started in the family of J. H—n, in a little hamlet called Aleyton, this township, in the person of his

9-year-old son, August last; up to the time of his sickness, he with a neighbor boy had been constantly playing and bathing in White river, which runs about 10 rods from the house. The family told me that in summer time there is from this river a foul scent which rises at night and spreads over the town which in the morning smells quite unwholsome. The boy's sickness was pronounced typhoid fever from the start. The other boy who played in the river was also taken sick about a week after boy No. 1, his case was not pronounced typhoid. * * * .

"Before the H—n boy recovered, his parents were both taken down with what the doctor called malarial fever, the result. the Doctor said, of overwork and would have terminated in typhoid fever if they had not immediately gone to doctoring. The mother's fever ran nearly two weeks, boy's fever 21 days.

"On the 29th of August while case No. 1 was yet down with the fever, Mrs. H—e did a washing for the H—n family, which had not been disinfected. Mrs. H—e had not been in good health for some time and in the latter part of September was taken sick. Dr. said it was malarial fever, was not called typhoid fever any of the way through. Between the first and middle of October she died; her house and premises were very unsanitary, neighbors said it was really filthy, the well near the door where slops were thrown out and a decaying chip yard over it, with lots of other rubbish lying around.

"I will say while I think of it, that the premises and house of Mr. H—n were clean and all right, the well is a flowing one, 100 feet deep with tight pipe running to the bottom. As soon as the first case appeared the well was abandoned. In about three weeks after, Mrs. H—e was taken down, her daughter, Mrs. B—d a widow with her children living in the same house, came down with typhoid fever. One week after, her daughter Mary was taken down with typhoid fever, a week longer and Mable B—d came down with typhoid fever, next, a week later Bertha B—d came down with same disease. During this time Myrtle H—e, a daughter of Mrs. H—e deceased, who was staying with her sister, Mrs. J. R—y was taken down with typhoid fever and died, and now Mrs. R—y and one of her girls about 10 years old are both down with typhoid fever, their house is small and unsanitary appearing, sick and well are together most of the time, the same in the case at the H—e place although there is considerable more room. I do not think there has been disinfecting enough in any house done to stop the spread of the disease. At the H—n house there was none at all, the doctor did not order it although he pronounced the first case typhoid fever from the start, children were not allowed in the house; this was the only thing done to stop its spread, the doctor said older people would not catch it. Bowel discharges of first patient at the H—e place were not disinfected at all, was told that the others were. At J. R—'s the discharges were mostly disinfected, drinking water was not boiled. At the H—e place a little was boiled but not all, none of the houses have been fumigated, the H—e and R—y houses are too open to be fumigated while there is sickness.

"The reason I would give for the disease going through the H—e, B—d and R—y families is that they are all relatives and until they were taken sick they were most of the time around the bedside of Mrs. H—e, *drinking after her from the same dishes*, etc. They acknowledge that they have been very careless. The neighbors were afraid of the disease and stayed away.

"Do you not think that if proper care had been taken on the start and that first washing had been disinfected, that Mrs. H—e would not have contracted the disease? Do you not think that it is reasonable that Mrs. H—e took the disease doing that washing and carried it to all the other patients, and do you not also think that our legislature could make a law that would be likely to check the spread of contagious diseases? I will suggest one: In the first place you will understand that Doctor D—s who has attended the most of these case has not been very long in this State and is unacquainted with our laws, and to overcome the difficulty, I think if our legislature would make it the duty of every Township Board, Village and City Councils to supply doctors with health laws of the State, there would be no Doctors practicing in the State who would be ignorant of the law as there now is, and will be so long as there are no measures taken to prevent it; and I would recommend that all local doctors be required to announce all diseases as contagious diseases, such as the State Board of Health would consider as such and I would further recommend that all doctors be required to cause the disinfection of all cloths, clothing and bedding of all patients having a disease such as the State Board of Health would consider as contagious. This would prevent unprincipled and unlearned Doctors from letting the disease spread. (I was told by these families having typhoid fever that these three doctors claimed that this disease was not contagious, while in my judgment the circumstances prove the contrary.)

"I think if the rules of the State Board of Health had been strictly observed in this case the disease would have been arrested right at the start and two lives would have been saved and a considerable of suffering and expense would have been avoided."

December 9, 1897, Health Officer Cool wrote this office relative to the same outbreak, stating that it was through ignorance of the health laws that one case was not properly reported, and relative to the diagnosis of the L—— case he says:—

> "You remember in my last week's report I stated that the L—— boy who played in the river with the H—— boy did not have typhoid fever, but on enquiring of the doctor, I find that both cases were reported as typhoid fever."

Again on Dec. 10, Mr. Cool writes:—

> "I neglected to state that Dr. ——, who is practicing in company with Dr. D——s, said to me that when he saw Mrs. H——, who died in October, her disease had partially the form of typhoid fever. I asked him if I should report it as such, but he told me not to."

December 16, another letter was received at this office from Mr. Cool in which he states that the attending physician in the case of the H— boy stated that the disease was not typhoid fever, but was malarial fever, although the L— boy's case was characterized as a mild case of typhoid fever, and the sickness of both boys was attributed to "continually bathing in White river."

December 17, 1895, Mr. Cool again wrote this office relative to the outbreak, and to the measures he had adopted for its prevention, which were in pursuance with the suggestions of the State Board of Health concerning isolation and disinfection and the discontinuance of wells which might be infected. Again on December 23, Mr. Cool wrote this office as follows:—

> "Shall I see that nurses do not go away from the premises to other houses to expose other persons? The doctors encourage the people to think this idea a foolish one. The B— house is very unclean they not having help enough to do the work, people will not go there to nurse and expose themselves. Should have said they do not have a sufficient number of nurses, those that are there go about I think as they please, have told them not to do so."

The secretary of this Board wrote approving of Mr. Cool's method of procedure and suggesting that in case the nurses went about from one place to another that they disinfect themselves and their clothing before so doing.

Mr. Cool wrote this office on March 30, 1896, summing up the outbreak and stating relative to the diagnosis, which seems to have been different in some cases which took the disease from a common source, as follows:—

> "Not a single case was reported to me as they should have been. It is my opinion that if the local health board had done their duty in these cases much sickness would have been avoided and the township would have had a less bill to foot. You will see that the physician called the first case malarial fever, but the parents of the sick boy thought it was more of a typhoid nature, the fever ran twenty-one days in this first case. In the case of Mrs. H—, you remember the Dr. reported it to have been malarial fever and her death he said was caused from uræmic fever, but Dr. D—y. * * * said when he made his visit to the H—e family, he thought the symptoms were more of typhoid fever. Mrs. H—e's sickness I think can be clearly traced to the washing she did for the H—n family which had not been disinfected, although she was not in a good state of health at the time of the washing. There is no question but that the two boys contracted their sickness by bathing in the White river and the physician called the second boy's case, typhoid."

There seems to be doubt among the physicians connected with this outbreak as to whether or not all the cases were really typhoid fever, and in Health Officer Cool's reports there are contradictory reports relative to the first two cases. For instance, in his first letter, of Dec. 3, 1895, speaking of the two boys who first contracted the disease he says: "The boy's sickness was pronounced typhoid fever from the start. The boy who played in the river was also taken sick about a week after boy No. 1, his case was not pronounced typhoid fever." And again in his letter of March 30, 1896, he says: "There is no question but that the boys contracted their sickness by bathing in the White river, and the physician called the second boy's case typhoid fever." From all the evidence it seems probable that all the cases were typhoid fever and with the exception of the L—— boy and another case which is barely reported, they all came directly or indirectly from the first case, that of the H—n boy. He was not isolated nor were his bowel discharges disinfected, his sickness was followed by that of both his parents (and there is no record that the excreta of the H—n parents was disinfected), and by that of a Mrs. H—e who did a washing of infected clothing, etc., for them, and who was shortly after taken sick with the same disease, and died. Members of the H—e family, viz., Mrs. H—e's daughter, a widow and her three children were taken, each about a week apart, with the disease, and, about the same time, another daughter of Mrs. H—e, Myrtle H—e, who was living with the R— family, contracted the disease and died. Following her, Mrs. R— and three daughters were taken with the disease and Mrs. R—— died. As the health officer says of them, "they were most of the time around the bedside of Mrs. H—e, drinking after her from the same dishes."

A correct diagnosis of the disease in the first place, one which would have given the public health the benefit of the doubt, and careful isolation and disinfection of the first case, the H—n boy, would probably have saved the 11 cases of sickness, and 3 deaths, of persons who seemed to have contracted the disease from him, and even after the sickness of the parents, and the infection of Mrs. H—e, when the disease was plainly shown to have been contagious, had a strict obedience of the health-laws been observed, it is probable that 9 cases and 2 deaths would have been saved.

Typhoid Fever in Rose Tp., Ogemaw Co. Well Infected by Filthy Surroundings.

An outbreak of typhoid fever in the township of Rose, Ogemaw Co., which began in September, 1895, and resulted in 6 cases, but was without fatality, was traced to a lumber camp, where the water was probably contaminated by the filthy surroundings.

Hon. A. S. Rose, Health Officer of Rose Tp., wrote to this Office Nov. 1, 1895, giving information relative to the outbreak. Portions of his letter showing the condition of the surroundings, and the probable contamination of the water supply, were as follows:

> "Found the sanitary condition of the camp very bad, the well where they procure water for all purposes is about 150 feet from the camp. The camp is 15 to 20 feet above the well and all the refuse matter from the camp water-closet and barns, hog-yard, etc., drain directly towards this well. The camp has been occupied for a year and in my judgment this is the main cause of the sickness in said camp. I found the water-closet to be within 6 feet of the corner of the men's sleeping-camp, simply an open drain or ditch enclosed with a rough building—no covering to the trench. Has been used a year and no disinfectants used. I found the barns for stabling purposes to be alongside of men's quarters and only fourteen feet from same. Been used a year, and nothing removed; manure 4 to 8 feet deep for 40 feet square, with 12 to 14 hogs running in same. I directed as follows: First, that a new well be dug on the side of the hill where the drainage from the camp could not pollute the water. Second, the removal of the closet, or sink, the filling up of old one, and the daily use of disinfectants in new one. Third, cleaning up around the barn of all refuse matter. Fourth, the thorough cleaning of the men's quarters, burning of sulphur therein and the daily use at present of diluted carbolic acid by dipping cloths

in same and hanging up in camp. I did not like to order removing barn if not positively necessary as it is expensive back there in the woods, it is a bad place to get water. Do not know as they will succeed, will go there again as soon as able. The camps are badly located. If your whole Board had been present with a desire to meet a perfect pest hole, I do not think you could have done better than was done. The camp consisting of seven or eight buildings should have been built below the springs or well, the formation of the ground is such that it is impossible to prevent drainage into this well without moving every building. As near as I could find out, about 25 men left the camp sick, in the last 3 weeks, but there is no way of finding out what the disease was, only we know that there is typhoid fever there now and that it is being spread all over the State. If you can give me some instruction or advice, shall be glad to receive some."

The Secretary of this Board wrote to Mr. Rose, Nov. 2, 1895, expressing his pleasure at the prompt measures which had been taken, sending some of the pamphlets and leaflets bearing upon the subject and urging that the water be thoroughly boiled. November 26, 1895, Health Officer Rose again wrote this Office, in substance, that the foreman of the camp had become alarmed at not being able to secure more help on account of the typhoid fever, and had complied strictly with the directions of the health officer and that as a result, "there was not a case of typhoid fever after that day. I supposed there would be, from previous experience, but there was not. I think the outbreak was solely due to bad water caused by all the drainage from privy, camp and barn running down a steep hill directly into the shallow well, it being only five feet deep."

TRANSPORTATION OF CORPSES DEAD FROM TYPHOID FEVER.

Typhoid fever in Capac, St. Clair Co., alleged to have been caused by transportation of corpse.

An outbreak of typhoid fever in Capac, St. Clair Co., which resulted in 3 cases, and which lasted from Oct. 10, to Dec. 3, 1895, was alleged to have been caused by the transportation of a corpse infected with the disease, from Unionville, Tuscola Co.

October 12, Robert McGurk, M. D., Health Officer of Capac reported two cases of typhoid fever to this Office. Pamphlets relative to that disease, for distribution, were sent, and the health officer was also requested to send weekly reports to this Office.

Again on October 16, Dr. McGurk, wrote to this Office, and after asking information relative to the auditing of a bill by the Village Council for the payment of medical attendance on a family having typhoid fever, says:—

"Were any reports sent you from Unionville, Mich., in August last? A son of the present afflicted family died at that place, and the physician's certificate read 'Remittent fever'. The body was shipped here for burial, and the casket opened in the house. I wish you would look into the matter, as I think the case was typhoid, and if so, the physician has done this place an injustice by placing such a certificate on the box. The deceased young man's partner, I understand, is ill with typhoid fever in Bay City."

In answer to the above letter, the Secretary of this Board wrote to Dr. McGurk, October 17, 1895, answering his questions as to the liability of the county in case of the care of indigents sick with a dangerous communicable disease, and as follows:—

"Relative to the reports from Unionville in August last. On August 21 I wrote to the health officer of Unionville relative to an alleged outbreak of typhoid fever, and August 23 I received a communication from the health officer saying it was remittent fever. I presume it was typhoid fever. This Board has voted that all fevers of doubtful origin continuing more than seven days should be considered, for public-health purposes, typhoid. Certainly any such fever which proves fatal should be considered typhoid.

"I wish you would inform me whether or not there was any connection between the corpse you mention that came to Capac from Unionville and the case you report today."

October 18, a postal came from Dr. McGurk, as follows:—

"In answer to your letter of yesterday would say that the corpse which came from Unionville was brought home to his father's residence, and his brother and sister are now reported ill with typhoid fever. The corpse remained in the house for about fifteen hours before burial."

October 21, letters were sent from this Office to both Dr. McGurk and to Dr. W. C. Wright, Health Officer of Unionville, making inquiries relative to the case of typhoid fever in question. The letter to Dr. McGurk, was as follows:—

"I shall be glad to know the name of the young man who died of 'remittent fever' (typhoid) in Unionville, and the name of his partner who is sick in Bay City; and, if practicable, the number of the street where the partner is sick in Bay City, as I shall wish to write to the health officer of that City.

"Please inform me whether or not this 'young man' was away from Unionville any time within about two weeks before being taken sick, and especially whether he had or had not visited his parents in Capac, about two weeks previous to being taken sick, or any other points you may have or be able to ascertain regarding the source of the contagium. When did the corpse arrive at Capac, and *was it removed from the coffin*, or was the body or any contents of the coffin in any way exposed so that the infection may have come from the corpse or coffin's contents? Over what railroad did the corpse come?"

Dr. McGurk replied to this letter on October 24 as follows:—

"The name of the young man who died at Unionville of reported remittent fever was Reuben Conly, and the name of his partner is Dan Merrit of Bay City, I cannot give the number of the street on which he lives. Mr. Conly was at Bay City two weeks before he was taken ill, but had not visited his parents here since the last week of June. The corpse was brought here over the M. C. R. R., and C. & G. T., and arrived on the night train. I went to the depot and found the remittent fever certificate on the rough box. The undertaker took the casket to the parents' house, removed the corpse and undertook to embalm it. I did not see the corpse until the next morning, when I found it so badly decomposed I ordered the undertaker to apply disinfectants freely in the casket and seal it up as quickly as possible. The burial took place in the afternoon. The brother and sister were taken sick in about three weeks afterwards. they are not very seriously ill, but the attending physician reports them as genuine typhoid fever."

The letter sent to Dr. W. C. Wright, Health Officer of Unionville, from this office on October 21, was as follows:—

"I am informed that in August a young man by name of Conly died in Unionville, and was shipped to Capac, St Clair Co., and the certificate of death read 'Remittent Fever'. It is alleged that the cause of death was typhoid fever, and that two other members of the same family now have typhoid at Capac.

"This is an important subject, and it seems that there has been an unfortunate mistake made by some person at Unionville. I shall be glad to be informed just when the corpse was transported from Unionville to Capac, over what railroad, and the name of the attending physician. Was the corpse shipped with your knowledge, and did you give permit for the transportation of the corpse?

"It is also alleged that the above-mentioned young man's partner is now sick with typhoid at Bay City.

"I would like to know (1) when Conly was taken sick, (2) how long he was sick, (3) where he had been for the two weeks before he was taken sick and (4) any other information bearing on the subject, including statement of (5) any other case of fever in Unionville this summer or fall.

"It is said that his corpse was in his father's house at Capac for about fifteen hours.

"Is it common in your vicinity for death to result from 'remittent fever'?"

In answer to these questions, by letter, October 22, Dr. Wright said:—

"(1) Conly was taken sick during the fore part of August and was sick between two and three weeks. (2) He had been here in Unionville for about two months before he was taken sick. (3) There have been, mild and severe, over one hundred cases of fever here this fall and summer. (4) Dr. Lowthian was the attending physician on Mr. Conly and I signed the transportation certificate with Dr. Lowthian. I am aware many physicians have diagnosed our fever cases, typhoid, I have yet to find one when he has been informed as to the symptoms, duration and general course of these fevers, but what withdraws his diagnosis and agrees with us that these cases are remittent, (or continual malarial) Mr. Conly's partner who is sick in Bay City was here long enough after Mr. Conly's death to have contracted the fever if it was contagious. He was here two or three weeks and in good state of health. He probably took it in Bay City.

"The remains were transported over the Saginaw, Tuscola and Huron R. R. to Saginaw, from there I do not know."

October 24, a letter was sent from this Office to Dr. Wright in which was asked the name and address of Mr. Conly's partner, and the date of the shipment of the corpse and suggesting a thorough investigation of the outbreak of fever, so as to discover whether it was typhoid or not and suggesting that a bacterial examination be had. The health officer of Unionville gave the date of the shipment of the corpse as August 26, but did not adopt the suggestions of this Office, and on Oct. 25, another letter was sent to Dr. McGurk, at Capac, thanking him for the interest and attention he had given the matter, and also asking him the exact date of the shipment of the corpse. He corroborated the statement of Dr. Wright. The health officer of Bay City was written to for information as to the Merrit case, but no information was gained.

Transportation of Typhoid Fever Infected Corpse from Cass City to Detroit.

An instance of violation of the Public Health Laws, or at least neglect to carefully observe their provisions, and fulfill completely their requirements, was brought to the attention of the Secretary of the State Board of Health, first by an article in the Detroit Journal of Oct. 21, which contained an account of the death, from typhoid fever, of Dr. McL——, and which stated in substance that his remains were to be taken to Detroit on that date; and later on, October 25, by letter received from Samuel P. Duffield, M. D., Health Officer of the City of Detroit, enclosing a circular, issued by the Michigan Central Railroad Co., to its agents, which refers them to Act No. 45, Laws of 1895. In a portion of his letter Dr. Duffield, says:—

"Only a few days ago we received a body from Cass City, the brother of Dr. —— of this City, who died at Cass City of typhoid fever. No request was made to this Office for permit. The first we knew, the body was here—what was I to do? If I held the body above ground, and prevented its burial, would I not jeopardize more than to have it put at once into a vault at the cemetery? Your small village and town Health Officers are not following your State Law."

The Secretary of this Board wrote Dr. Duffield, in answer to the above letter, Oct. 26, as follows:—

"Your letter of Oct. 25, is at hand, for which accept my thanks, as also for a copy of the circular issued by the M. C. R. R. Co., with your page of written comments. If you will read this law—Act No. 45, laws of 1895—you will see that it is not the *health officer* who is to secure the permit of the board of health or of the health officer of the township, city or village *into* which the infected dead body is to be taken. It is the duty of the person who wishes to make the removal, or the undertaker or common carrier who actually makes the removal.

"Accept my thanks especially for the information relative to the arrival in Detroit of a body dead of typhoid fever, brought to Detroit from Cass City. You say 'What was I to do?' Precisely what you have done, promptly notify the office of the State Board of Health of the facts, so that I may call the attention of the railroad authorities, and all others concerned in that removal, to the new law, with a view of preventing such occurrences in the future. If every health officer throughout the State will thus promptly notify this office, I trust that it will not be long before this source of danger will be reduced to a minimum.

"You say 'Your small village and town health officers are not following your State law.' I think they are following the law quite as well as the large-city-health officers. As I have previously pointed out, it is not the business of the health officer of the place *from* which the body is removed to obtain the permit from the place *into* which the body is removed. Although it is very proper to *notify* the health officer of the place to which the body is going.

"Recently a body dead of typhoid fever was sent to a country village, without notice to the health officer, and the body was removed from the coffin, and remained in the residence about fifteen hours, and not long afterwards typhoid fever developed in that residence. I am doing what I can to put a stop to such occurrences. I trust you will earnestly coöperate with this office in this effort, by promptly informing this office of every case of the violation of the requirements of Act 45, laws of 1895."

On the same date as the preceding letter, October 26, a letter was sent from this office to W. C. Sanford, Gen. Freight and Passenger Agt., P. O. & N. Ry. Co., Pontiac, Mich., as follows:—

"Information reaches this office that McL——, M. D., of Cass City, died Oct. 22, from typhoid fever, and that his dead body was transported over your road; and that no permit for removal to Detroit was ever obtained from the health officer of Detroit, in accordance with Act 45, Laws of 1895. Herewith I send you a copy of that law, in which I have marked parts bearing on that subject. If your road has ever issued special orders to local station agents regarding the transportation of dead bodies and relative to special permits in accordance with Act 45, I shall be very glad to receive a copy. This transportation seems to have been in direct violation of this law, and I would be glad to have you investigate and ascertain with whom the fault lies.

"Typhoid fever *is a 'disease dangerous to the public health'* and should, of course, be included in the statement of the law which reads—'or from any other communicable disease dangerous to the public health'."

Mr. Sanford replied to the foregoing letter from this office, on Oct. 30, 1895, enclosing a copy of the telegram from the local agent, a copy of the "Memorandum of Agreement of the Railway Association of Michigan for 1895" and also a copy of the affidavit of the undertaker who embalmed the body.

The letter from Mr. Sanford, and the telegrams and affidavit following in order, show that care was exercised in the matter, and the only performance which was omitted to make the transaction strictly according to the requirements of the public health laws was in omitting to secure the permit from the health officer of Detroit.

Mr. Sanford's letter is as follows:—

"Replying to your favor of the 26th inst., concerning the shipment over our line of the body of the late Dr. McL—— of Cass City, I beg to submit herewith a copy of the telegram received from our agent Cass City October 21st, Marked 'A,' Copy of my reply thereto marked 'B,' a copy of the memorandum of agreement of the Railway Association of Michigan for 1895, marked 'C,' and a copy of the affidavit of the undertaker, A. A. McK—— of Cass City, marked 'D.' You will note first, that the telegram from the agent at Cass City states that the physician who attended Dr. McL—— stated that the cause of death was Typhoid Malarial fever and not contagious. Second, that my wire to the agent in reference thereto stated that the rules prescribed in the Railway Association memorandum of agreement for 1895 should be complied with. Third, that the aforesaid rules which are given as a part of the State Law governing such cases prescribes the manner in which bodies of those who have died of Typhoid Malarial fever shall be prepared for shipment. Fourth, that the affidavit of the undertaker, Mr. McK——, shows that these rules were strictly complied with. Before accepting this body for shipment I sent to the Health Officer of Pontiac, also to the principal undertaker, to ask if any changes had been made in the laws governing the shipment of dead bodies during the late session of the legislature. Both of these gentlemen stated that they knew of no change in the laws, and that the rules laid down in the

Memorandum of Agreement for the Railway Association of Michigan were identical with the copies of the law on file in their respective offices. Under these circumstances I deemed it proper to accept the body for shipment. The only point which seems to have been overlooked is that of obtaining a permit from the Detroit Board of Health, and I will at once issue a circular to agents calling their attention to this provision of the law, and trust you will have no future cause for complaint against this company."

Copy of telegram from Agent.

"The body of Dr. McL—— is offered for shipment to Detroit, certificate of attending physician and health officer stating that cause of death was Typhoid Malarial fever and not contagious. Shall I accept remains? They have no metallic coffins here."

Copy of reply to Agent's telegram.

"Section 20, Railway Association agreement for 1895, prescribes rules for transportation of dead bodies. The rules are taken from State laws and if we evade them in any particular we are liable as common carrier. If the body of Dr. McL—— is prepared in manner prescribed by the rules you can accept for shipment, otherwise it would be useless for us to take it for it would not be taken to Detroit by connecting lines, owing to the strict inspection by Detroit Board of Health."

Copy of affidavit from undertaker.

"This is to certify that I embalmed the body of J. H. McL—— after his having died of typhoid malarial fever, and wrapped in a sheet thoroughly saturated with a strong solution of bi-chloride of mercury, in proportion of one ounce of bi-chloride of mercury to a gal. of water, and encased in a coffin and said coffin then placed in an air tight zinc box and hermetically sealed, then enclosed in a strong wooden box."

The section of the "Memorandum of Agreement for the Railway Association of Michigan" to which Mr. Sanford called attention, is as follows:—

"The bodies of those who have died of *Anthrax*, *Scarlet fever*, *Puerperal fever*, *Typhoid fever*, *Erysipelas*, *Measles and other contagious*, infectious or communicable diseases must be wrapped in a sheet thoroughly saturated with a strong solution of bi-chloride of mercury, in the proportion of one ounce of bi-chloride of mercury to a gallon of water, and incased in an air-tight zinc, tin, copper or lead-lined coffin, or in an air-tight iron casket, hermetically sealed, and all enclosed in a strong, tight wooden box; or the body must be prepared for shipment by being wrapped in a sheet and disinfected by a solution of bi-chloride of mercury as above and placed in a strong coffin or casket, and said coffin or casket encased in a hermetically sealed (soldered) zinc, copper or tin case, and all enclosed in a strong outside wooden box of material not less than one inch and a half thick."

Typhoid Fever in Oliver Tp., Huron Co.—Strict Isolation not Necessary—Infected Localities should be Placarded.

During an outbreak of typhoid fever in Oliver Tp., Huron Co., which resulted in 7 cases, and lasted from Sept. 22 to Dec. 30, a letter was received at this Office from W. E. Treadgold, M. D., Health Officer, October 1, which was as follows:—

"Please state if typhoid fever and typho-malarial (so-called) are subject to strict isolation."

The Secretary of this Board wrote, October 2, in answer to Health Officer Treadgold's letter, as follows:—

"Replying to your letter of Oct. 1, my opinion is that typhiod fever is not often transmitted directly from one person to another, and that *strict isolation is not usually necessary* for its restriction. It would be wise, however, for all who can properly do so, to keep away from the premises. Perfect cleanliness of nurses and attendants should be enjoined and secured. As the hands of the nurses may become contaminated by the poison, a good supply of towels and basins, one containing a solution of chlorinated soda (one part of Labarraque's solution 'liquor sodæ chlorinatæ' to five parts of water), chlorinated lime or the zinc solution, and another for plain soap and water,—should always be at hand. Dishes used by the patient should be thoroughly washed in boiling water, before being used by another person. Care should be taken that the bowel discharges are *all* destroyed or disinfected.

"*With proper precaution and cleanliness*, I believe that strict isolation of a typhoid fever patient is not necessary."

Relative to the necessity of placarding of infected localities, a letter from Health Officer Treadgold, of January 14, 1896, which related to the same outbreak, asked the following question:

"I reported to you that D. W——, of Elkton, had typhoid fever. The same day I wrote you their physician reported to me typhoid fever, and when I went to put up the sign, W——s were awful mad so their physician turns round and reports that he was mistaken, that it is typho-malarial, and W—— pulled my sign down.

"I still believe it to be typhoid fever.

"What shall I do in this matter?"

January 15, 1896, another letter was sent from this Office to Health Officer Treadgold, as follows:—

"Every case of so-called 'typho-malarial fever' and every case of fever of doubtful origin continuing more than seven days, should be reported to the local health officer, and the same precautions taken as are taken in other cases of typhoid fever.

"Act 137, laws of 1883, makes it the duty of the health officer whenever he has received reliable notice, or shall otherwise, have good reason to believe, that there is within his jurisdiction any dangerous communicable disease to immediately 'investigate the subject' and 'To give public notice of infected places by placard on the premises, and otherwise if necessary.'

"Sec. 2 of the act above referred to provides a penalty for whoever shall knowingly violate the orders of the health officer made in accordance with section one of said act. It is your duty to enforce the law, or give notice of any violation, to the prosecuting attorney."

Typhoid fever in Mt. Pleasant, Isabella Co.—Should be reported to local health officer.—Premises should be placarded.

Two outbreaks of typhoid fever in Mt. Pleasant, Emmet Co., one of which lasted from Feb. 20 to Apr. 16, 1895, the other from Aug. 9, 1895, to Jan., 1896, with a total of 27 cases and 2 deaths, presented two points upon which the local health officer and physicians seem to have disagreed. They were the reporting of cases of typhoid fever by householders and physicians to the health officer; and the placarding of infected premises.

The opinion of the Secretary of this Board was asked several times by the local health officer, A. T. Getchell, M. D., the first of whose letters was as follows:—

"There is a case of typhoid fever in the city under Dr.————'s care, and he has been sick two weeks next Monday. The doctor will not condescend to report the case. This man is the husband of the lady that was sick last month. Some one was telling me about the case and I saw the lady that recovered from the fever and she said that her husband was taken sick Aug. 26, '95. I entered suit before the Prosecuting Attorney for his (Dr.'s) stubbornness in the matter. He has the law; I sent him a pamphlet when he reported the first case. * * * If I am wrong let me know by return mail."

A letter was sent from this Office, September 9, to Dr. Getchell, in answer to the above, as follows:—

"The law is very plain requiring physicians to report all cases of dangerous communicable diseases to the health officer, and for *all* violations the health officers of villages and cities *must notify prosecuting attorney*, and the prosecuting attorney must prosecute for all such forfeitures incurred within his county."

October 8, 1895, the health officer of Mt. Pleasant again questioned this Office, as follows:—

"Please tell me whether it is necessary to placard a house where there is typhoid or typho-malarial fever."

The day following, a letter was sent to Dr. Getchell, stating briefly in substance that it *was* necessary, and continuing:—

"Give public notice of infected places, so that no person may unguardedly drink water or take food from a source likely to be contaminated."

Again on the back of an "L" blank, which reached this Office Dec. 2, the health officer complains of the dilatory conduct of the local physicians, and requests the Secretary of this Board to impress upon the physicians the necessity of reporting promptly. A letter from this Office of the same date substantially repeated the previous letter from this Office of Sept. 9, and referred Dr. Getchell to the Public Health laws on the subject.

Dec. 18, Dr. Getchell addressed this Office on the subject of isolation and placarding infected premises, and cited the manner of treating typhoid fever in Detroit as a good reason for not obeying the rules of the State Board of Health. His letter is as follows:—

"If a case of typhoid fever breaks out in a hotel how would it do to place a card over the door of the sick room in the hall, and give full instructions to allow no one in but nurse and physician; or is it absolutely necessary to place a card on the outside of the hotel which would practically close the house and be a great damage to the landlord and would not isolate the patient any more by having the card on the outside. There is a trained nurse here from Detroit, from Grace Hospital and she says that typhoid fever is taken into the general wards with other patients, and laughed at the idea of placarding a house for typhoid fever, she says they do not do it in Detroit."

Dec. 21, the above letter was answered from this Office, as follows:—

"Relative to the placarding of the hotel depends upon where the danger is. If the person sick contracted the fever from some source outside of and away from the hotel, probably the placarding of the room where the patient is would be sufficient. While isolation of those sick with typhoid fever is not always necessary, yet, as typhoid fever is sometimes transmitted through the air, also directly from one person to another, it is wise for all who can properly do so, to keep away from the premises.

"Relative to placarding, public notice should be given of every infected place, so that no person may unguardedly drink water or take food from a source likely to be contaminated, *or in any other manner contract* the disease.

Typhoid fever in Calumet Tp., Houghton Co.—Should Children from Infected Houses be allowed to attend School?

November 4, 1895, a letter was received at this Office from Robt. M. Wetzel, M. D., acting health officer of Calumet Tp., Houghton Co., where 44 cases and 2 deaths were reported, in which he asks:—

"Is it advisable or permissible to allow children (in whose homes typhoid fever exists) to attend the public schools?"

The Secretary of this Board replied, Nov. 5, as follows:—

"Relative to allowing children in whose homes typhoid fever is present to attend school, the prevailing opinion seems to be that typhoid fever is not often transmitted by clothing; and yet it has been known to be transmitted by clothing worn by those sick with typhoid fever; and while isolation of the sick is not always necessary if extreme care is taken, yet typhoid fever is sometimes transmitted through the air, also directly from one person to another, therefore it is wise for all who can properly do so, to keep away from the premises where typhoid fever is present.

"Probably if you wish to be absolutely on the safe side it would be well to keep the children at home, and yet I do not know as I wish to advise that, if extreme care is taken with the sick."

NUCLEIN USED IN THIRTY CASES OF TYPHOID FEVER AT MARQUETTE, MICHIGAN, WITH SUCCESSFUL RESULTS. IS IT AN "ANTITOXINE"?

From August, 1895, to Jan. 4, 1896, Marquette, Michigan, has been having an outbreak of typhoid fever. In the City outside of the Hospital there were reported 20 cases and 2 deaths. There were in the St. Mary's Hospital, 45 other cases of typhoid fever, and strange to say no deaths occurred. From the usual experience, four or five deaths might have been expected to have occurred from the 45 cases of sickness in the Hospital. On his final report of the outbreak to the Secretary of the State Board of Health, Dr. F. McD. Harkin, Health Officer of that City, said that he attributed the low mortality to the "persistent use of nuclein (Vaughan's) hypodermically." This information was of such interest that the Secretary of the State Board requested Dr. Harkin to make a detailed report with the view of placing it before members of this Board.

Chemists have made such progress that they are now able to separate the nuclei of the miscroscopic cells of which plants and animals are constructed. These nuclei contain the vital principle, and they are found in young cells; and as it is the nucleated white blood corpuscles and the blood plasma (which contains the nuclein in solution) which are the effective agents for the destruction of the germs of disease which gain entrance to the body, and as the nuclei in solution as "nuclein" has proved to be an antiseptic outside of the body, Prof. Vaughan has proposed the use of nuclein, injected into the body so as to avoid its digestion, as a remedy in tuberculosis and other diseases in which a germicide in the blood and tissues of the body seems to be needed. It is hoped in a similar manner, also, to render persons immune to certain diseases. In fact an important question is whether or not in nuclein we have an "antitoxine" or a substance which will prevent the formation of a "toxine" for some or all of the diseases caused by specific germs.

This report relates mainly to a method of medical treatment, but there has been, and is, a hope that nuclein may prove useful as a preventive of disease, by conferring immunity to some diseases, therefore its use may be studied by the sanitarian as well as by the physician. The following is a copy of his report:—

"*Marquette, Mich., Jan. 8, 1896.*

"*Dr. Henry Baker.*

"DEAR DOCTOR:—Am pleased to answer your inquiries concerning use of nuclein in typhoid. Nuclein was *not* used in the fatal cases as these occurred in the practice of other physicians, and I am the only physician using it that I am aware of. In my own practice, I used it in four cases of typhoid of the virulent type and feel satisfied that three of the cases were greatly benefited by its use, though the other might have recovered without it. In private practice have only used it in severe virulent cases.

"There is almost invariably a slight rise of temperature shortly after (1 to 2 hours) injecting, a reduction of temperature of 1 to 3 degrees, 5 to 8 hours later. Quantity and frequency of dose was governed mainly by gravity of symptoms and high temp. In long series of cases in St. Mary's Hospital (of which I am attending surgeon) we used it in all but the mildest cases, about 30 in all. Three of the hospital cases were hemorrhagic and 5 cases ran over 30 days, yet caused no anxiety after nuclein was used as they all pursued the same course as in case related above.

"In 10 cases arriving in hospital with temp. of 103½ or over, nuclein was begun at once, and were convalescing in from 10 to 16 days. Other cases assumed the mild character described before, but were not apparently shortened in duration. In all cases nuclein did not seem to retard emaciation.

"Only one patient developed one bed sore, and another had a parotiditis. Term of convalescence not naturally shortened. Three cases were used as test cases in this manner,—when severe symptoms were under control by use of nuclein. treatment was suspended, when severe symptoms reappeared, and nuclein again brought about favorable conditions. This was the uniform result three times in one case.

"The series of cases is not large, but I have so far formulated the following conclusions which I hope subsequent experience may justify:—

"1. Nuclein is of decided benefit in typhoid fever.

"2. It generally shortens the natural term of illness, especially if used in first week.

"3. It modifies the character of virulent cases by converting them into mild cases after 2 or 3 days treatment, though such cases may continue with slight febrile movement as long as cases under ordinary treatment.

"4. The pulse, as danger-signal in typhoid seems better sustained, quiet and full, under use of nuclein, and stimulants or heart-tonics require to be seldom resorted to.

"5. It appears to excite diaphoretic or eliminative function of the skin, an action that often continues for some time after suspension of its use, but only with beneficial results.

"In a few cases, the more prolonged ones, digitalis and strychnine and alcholics were used but not pushed.

"I have been trying to formulate the *rationale* of its action, but have not so far succeeded unless indeed it is as an antitoxine.

"This would seem to be true from its apparent good effects in pneumonia in 6 adult cases in which I have used it. Two of these cases were apex pneumonia, one of them a double apex, and I may say that such cases heretofore generally died on my hands. Both recovered. Of the other four cases, three recovered and one died, the latter a basic right-sided pneumonia which did well until the seventh day when fresh engorgement was noted in apex of same lung, and on evening of eighth day temp. went up to 105 3-5, and he died in a few hours. Hoping this may be of service,

"I remain yours very sincerely,

"HARKIN."

Jan. 24, 1896, Dr. Harkin reports five cases of recovery from pneumonia three of which were not extraordinary and nuclein was not used, one hospital case in which "both upper lobes of right lung were involved and the only part not consolidated lay below angle of Scapula behind." Another private case first seen on seventh day of illness apparently in a dying condition. Both severe cases recovered. "In these severe cases nuclein is used heroically and regularly at 4, 6, or 8 hour intervals, in doses of 20 to 40 minims."

Need for a Board of State Medical Examiners.

December 12, 1895, a letter was received at this office from Dr. F. L. Hoffman, Health Officer of LeRoy Tp., Calhoun Co., in which, after reporting a neglect on the part of one of the physicians, through ignorance of the public health laws, says:—

"I think that it is high time our State *had an Examining Board* which would at least require a knowledge of the sanitary rules of the State, before one is allowed to practice."

MEASURES TAKEN TO RESTRICT TYPHOID FEVER—RESULTS.

In studying the effects of efforts of health officers for the restriction and prevention of typhoid fever, and of the difficulties experienced by some of them in carrying out the methods recommended by the State Board of Health to that end, it is interesting to note the difference in the reported numbers of cases of sickness and of deaths, from this disease, in outbreaks where local health officers were enabled to enforce isolation and disinfection, and in those outbreaks in which, for any reason, those restrictive measures were neglected.

Table 8, and the diagram—Plate 885—which graphically illustrates it, exhibit, the difference, and show that in outbreaks relative to which the reports state that isolation and disinfection were enforced, there occurred 3.46 cases and .48 of one death per outbreak; whereas in those outbreaks in which isolation and disinfection were neglected there were 6.69 cases and 1.01 deaths per outbreak, or nearly twice as many cases and more than twice as many deaths in outbreaks in which isolation and disinfection were neglected as there were in those outbreaks in which the restrictive measures were enforced.

Table 9 indicates that in 1895 there was a saving of 1,845 cases and 276 lives through isolation and disinfection. This table is accurately compiled from the reports received at this Office, but as was noted in 1894, it is necessarily incomplete and it is not improbable that the indicated saving for 1895 is too large, and as in 1894, we must look for a possible discrepancy in the manner of compiling the reports of the health officers, or in the reports themselves.

An examination of Table 8 shows that there were 476 outbreaks where isolation and disinfection were doubtful, and that the number of cases and of deaths to the outbreak were slightly less than in those outbreaks in which isolation and disinfection were neglected, and slightly greater than in those where isolation and disinfection were enforced.

It has been the practice in the Office of the State Board of Health to consider as doubtful: all cases concerning which the health officer has made an uncertain report; all those which may have been reported as unknown; all those cases in which the questions of the State Board of Health have been left unanswered; also all those instances in which the thoroughness of isolation and the completness of disinfection are questioned. Column 2 of Table 8, shows that about six-tenths of all the outbreaks, cases and deaths reported to this Office, are so incompletely or unsatisfactorily reported as to be of a necessity considered as doubtful. Of the cases and deaths, which from inaccuracy or incompletness of the reports of the health officer are necessarily placed under the head of "doubtful," it is reasonable to suppose that had the statements been more complete and accurate, at least three-fourths of the instances would have been reported as having been neglected.

If two-thirds of the outbreaks, cases and deaths which appear in the "doubtful" column were transferred to the "neglected" column, where it is conservatively within the law of probabilities to place them, we would have in that column two-thirds of 476 outbreaks, 1,926 cases and 298 deaths, or, 317 outbreaks, 1,284 cases and 199 deaths, transferred to the neglected column, which with the 137 outbreaks, 917 cases and 138 deaths already there, would make a total of 454 outbreaks, 2,201 cases and 337 deaths, an average of 4.85 cases and .74 deaths per outbreak. If this is done and we multiply the number of all outbreaks (792), by 4.85 cases and .74 deaths, the ratios of cases and deaths respectively to the outbreak where insolation and disinfection is neglected, we have 3,841 cases and 586 deaths which would have occurred had all outbreaks been neglected. By deducting from these the numbers of cases (3,453) and deaths (524), which occurred, a saving is shown, of 388 cases and 62 deaths by insolation and disinfection.

According to the data in the office of the State Board of Health, Table 9 shows the number of cases and lives probably saved from typhoid fever during the six years, 1890—95.

TABLE 8.—*Typhoid Fever in Michigan in 1895: Exhibiting the Average Numbers of Cases and Deaths per Outbreak:—(1) in all the 792 outbreaks reported; (2) in the 476 outbreaks in which it is doubtful whether or not Disinfection or Isolation was enforced; (3) in the 17 outbreaks in which Disinfection was enforced and Isolation was doubtful; (4) in the 10 outbreaks in which Isolation was enforced and Disinfection was doubtful; (5) in the 10 outbreaks in which Isolation was enforced and Disinfection was neglected; (6) in the 57 outbreaks in which Disinfection was enforced and Isolation was neglected; (7) in the 137 outbreaks in which both Isolation and Disinfection were neglected; (8) in the 85 outbreaks in which both Isolation and Disinfection were enforced.*

	(1) All outbreaks. (792 outbreaks.*)		(2) Isolation or Disinfection or both not mentioned, or statements doubtful. (476 outbreaks.)		(3) Disinfection enforced—Isolation doubtful. (17 outbreaks.)		(4) Isolation enforced—Disinfection doubtful. (10 outbreaks.)		(5) Isolation enforced—Disinfection neglected. (10 outbreaks.)		(6) Disinfection enforced—Isolation neglected. (57 outbreaks.)		(7) Isolation and Disinfection both neglected. (137 outbreaks.)		(8) Isolation and Disinfection both enforced. (85 outbreaks.)	
	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Deaths.
Totals....	3,453	524	1,926	298	56	14	13	5	22	5	225	23	917	138	294	41
Averages.	4.36	.66	4.05	.63	3.29	.82	1.30	.50	2.20	.50	3.77	.40	6.69	1.01	3.46	.48

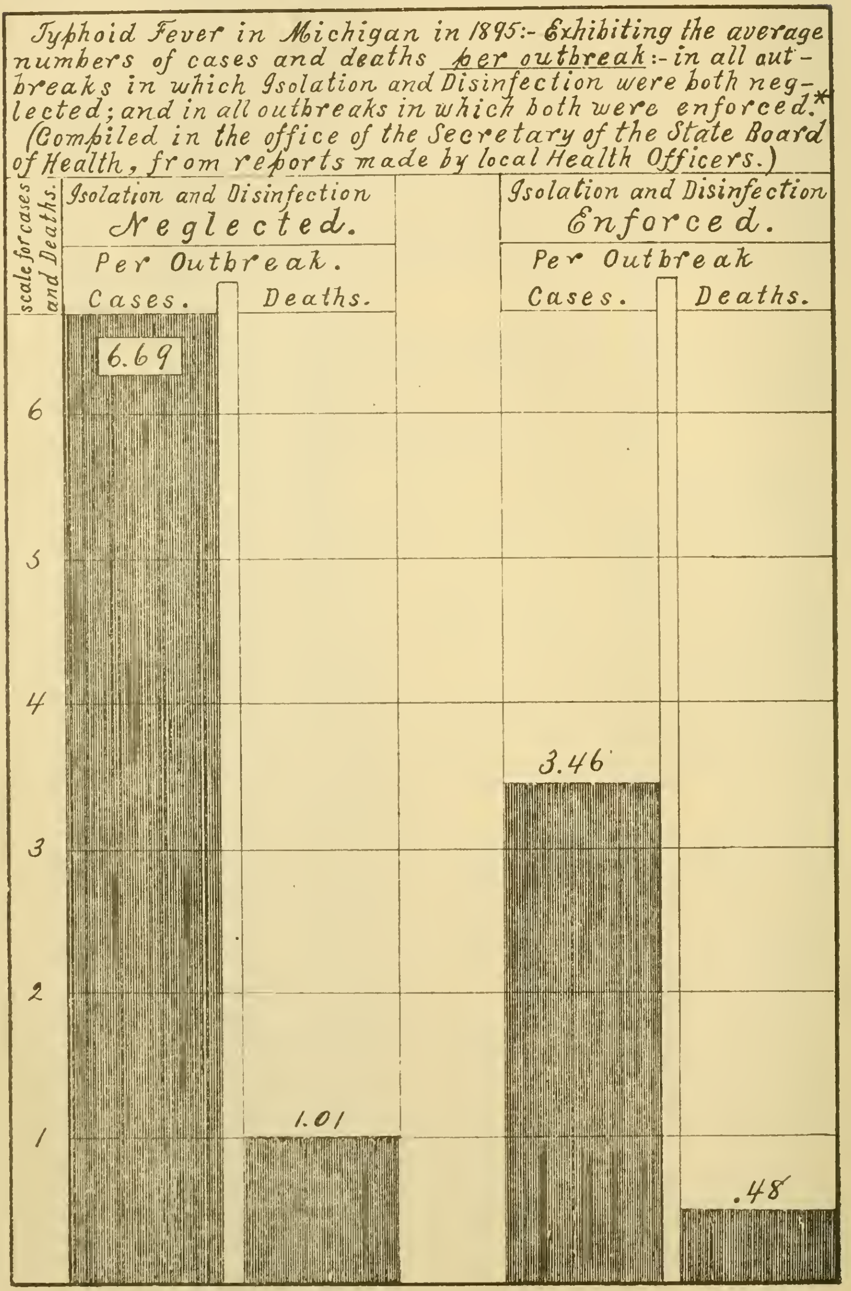
*These do not include the cases and deaths in Detroit and Grand Rapids because of the difficulty in determining the beginning and ending of an outbreak in these cities, in which the disease is present in some part of the city nearly all the time.

DEFINITION OF THE TERM, "OUTBREAK": An outbreak is considered as the existence of one or more cases of a particular communicable disease within any health officer's jurisdiction, whether city, village or township. All cases of the disease occurring within the jurisdiction during the outbreak are considered as part of the outbreak, unless the contagium cannot be traced to cases within the jurisdiction, and can be clearly traced to cases outside of the jurisdiction, in which instance they are considered as constituting a separate outbreak. When a period of 60 days or over has elapsed since the last case (in a given jurisdiction) died or recovered, the outbreak has been considered ended.

In the compilation of the reports for Tables 8 and 9 and the diagram [Plate 885] showing the results by isolation and disinfection, every effort has been made to place the numbers of cases and deaths in each outbreak in the proper columns. If, for instance, there were only one or two cases in an outbreak and the health officer neglected to isolate or disinfect, but for some reason the disease spread no further, the numbers of cases and deaths were placed in the column headed "Isolation and Disinfection both Neglected." If, on the other hand, as often occurs, quite a number of persons are exposed at the same time and place outside the health officer's jurisdiction, and by proper isolation and disinfection he succeeds in confining the disease to the original cases exposed, they are placed in the column headed "Isolation and Disinfection Enforced." If, however, he neglects to properly isolate or disinfect, the whole number of these cases and deaths are placed in the "neglected" column. It is to be regretted that many of the reports received at this Office do not state exactly what was done to restrict the disease, or are not sufficiently definite to enable the compilers to decide just what was done, and they are obliged to place all such in the column headed "Isolation or Disinfection or both not mentioned, or statements doubtful."

The last four columns of the last line in Table 8 are graphically represented in the diagram, Plate 885.

Isolation and Disinfection Restrict Typhoid Fever.



Typhoid Fever in Michigan in 1895:- Exhibiting the average numbers of cases and deaths per outbreak:- in all outbreaks in which Isolation and Disinfection were both neglected; and in all outbreaks in which both were enforced.*

(Compiled in the office of the Secretary of the State Board of Health, from reports made by local Health Officers.)

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* Including the disinfection of the bowel discharges of the patients.

[PLATE 885]

TABLE 9.—*Exhibiting for each of the six years, 1890–95, and the average for the period the numbers of Outbreaks, Cases and Deaths from Typhoid Fever represented in the six diagrams for those years, plate 885 being the last of the series, the numbers of Outbreaks, Cases and Deaths where Isolation and Disinfection were Neglected, the average numbers of Cases and Deaths per Outbreak, and the estimated Cases and Lives saved from Typhoid Fever.*

Year.	All Outbreaks included in the six diagrams.			Isolation and Disinfection Neglected.			Average per Outbreak where Neglected.		Estimated Saving.	
	Out-breaks.	Cases.	Deaths.	Out-breaks.	Cases.	Deaths.	Cases.	Deaths.	Cases.	Lives.
1890	330	1,924	304	53	349	51	6.58	0.96	247	13
1891	541	4,018	607	56	1,196	114	21.36	2.04	7,538	497
1892	524	2,195	416	41	183	38	4.46	0.93	142	71
1893	539	2,255	405	47	240	25	5.10	0.50	494	0
1894	596	2,537	405	61	282	32	4.62	0.52	217	0
1895	792	3,453	524	137	917	138	6.69	1.01	1,845	276
Total	3,322	16,382	2,661	395	3,167	398	48.81	5.96	10,483	857
Av. 1890–95	554	2,730	444	66	528	66	8.14	.99	1,747	143

AVERAGE DURATION OF TYPHOID FEVER.—FATAL AND NON-FATAL CASES.

From Table 10 it may be seen that, of the 725 males who were reported to have died from typhoid fever within the nine years 1887–95, and of which the interval between the day of being taken sick and the day of death was given, the largest per cent of males in any five-year period died in the two periods, from 1 to 10 days and 21 to 25 days of sickness, and that 51 per cent were sick twenty or more days before they died; while of the 529 females reported as having died in the same time, 23 per cent of the females died before the tenth day and 45 per cent before the fifteenth day and only 40 per cent were sick longer than nineteen days.

The average duration of the fatal cases in 1895 was in males 22.9 days and in females 20.7 days.

TABLE 10.—*Exhibiting, by sex of patient, the average duration (in days) of fatal cases of sickness from Typhoid Fever in Michigan, during the nine years, and each of the nine years, 1887–95. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of Typhoid Fever.

Year.	Sex.	No. of cases included.	Duration of Sickness:—Per Cent of Deaths in each Period of Days.*											
			All cases.	Under 10 days.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 days and over.
1887.	Males	81	100	10	7	15	21	16	11	12	2	4	1	0
	Females	32	100	31	19	19	16	6	3	0	0	6	0	0
1888.	Males	40	100	20	13	18	23	10	8	0	5	3	3	0
	Females	33	100	24	21	15	12	9	6	3	0	0	9	0
1889.	Males	42	100	17	14	19	7	14	5	7	2	7	0	7
	Females	51	100	18	24	14	16	10	2	6	2	2	0	8
1890.	Males	57	100	19	9	21	23	5	5	7	0	4	2	5
	Females	26	100	19	23	8	8	19	12	0	8	0	0	4
1891.	Males	80	100	14	20	18	23	10	6	5	1	1	0	3
	Females	56	100	20	23	20	11	9	2	5	5	0	0	5
1892.	Males	92	100	23	21	14	13	14	4	3	3	......	2	2
	Females	60	100	23	18	15	15	7	10	5	5	......	2	......
1893.	Males	94	100	24	15	11	13	11	4	5	3	4	4	5
	Females	84	100	25	30	7	13	7	7	6	7	1	0	1
1894.	Males	89	100	22	17	17	11	13	3	2	5	3	0	7
	Females	80	100	27	22	11	8	10	4	3	8	1	4	3
1895.	Males	150	100	19	17	15	17	7	9	4	3	3	2	4
	Females	107	100	24	22	15	8	7	7	7	4	3	1	2
Av. 1887–1895.	Males	81	......	19	15	16	17	11	6	5	3	3	2	4
	Females	59	......	23	22	14	12	9	5	4	4	1	2	3

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* In the head of each column showing the periods of days, the first number is included and the last number is not included; as in column 1, under 10 days includes 0 and 9, in the second period 10 and 14 are included, in the next period 15 and 19, etc.

TABLE 11.—*Exhibiting by Sex of patient, by per cent of cases which recovered in specified periods of time, the Average Duration (in days) of Non-Fatal cases of sickness from Typhoid Fever, in Michigan, during the nine years, and each of the nine years, 1887-95. (Compiled from those reports which stated the length of time the patient was sick.)*

Non-Fatal Cases of Typhoid Fever.														
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per Cent of Cases in each Period of Days.*											
			All Periods.	Under 10 days.	10 to 15.	15 to 20.	20 to 25.	25 to 30.	30 to 35.	35 to 40.	40 to 45.	45 to 50.	50 to 55.	55 days and over
1887.	Males	203	100	0	5	6	12	16	18	15	9	6	3	8
	Females	158	100	0	9	9	19	12	17	11	6	4	3	9
1888.	Males	164	100	1	4	13	9	13	15	9	10	9	9	7
	Females	111	100	0	2	7	14	15	15	19	4	8	10	8
1889.	Males	166	100	2	7	13	14	16	14	12	9	6	2	5
	Females	165	100	6	8	9	14	19	12	11	8	2	2	7
1890.	Males	226	100	1	4	7	15	18	19	12	10	5	2	8
	Females	110	100	......	4	14	16	17	13	14	9	2	5	6
1891.	Males	463	100	3	5	7	16	19	9	11	11	6	3	11
	Females	276	100	2	4	9	14	15	10	14	10	4	5	12
1892.	Males	329	100	2	4	5	16	22	12	12	11	5	2	9
	Females	177	100	2	5	8	15	14	14	9	8	8	4	14
1893.	Males	410	100	2	5	10	17	18	14	10	9	5	3	7
	Females	341	100	2	5	8	17	15	15	14	9	2	4	9
1894.	Males	453	100	2	6	7	14	15	16	13	7	6	3	10
	Females	340	100	2	5	9	14	18	17	11	7	5	4	8
1895.	Males	785	100	2	7	7	16	18	13	11	7	6	4	9
	Females	560	100	2	6	8	18	17	14	9	7	6	4	8
Av. 1887-95.	Males	355	......	2	5	8	14	17	14	12	9	6	3	8
	Females	249	......	2	5	9	16	16	14	12	8	5	5	9

* See star note under table 10.

In Table 11 it may be noticed that in *non-fatal* cases of typhoid fever for the nine years, 1887–95, 60 per cent of the males and 62 per cent of the females recovered before the thirty-fifth day of sickness. The average duration was: males 34 days, females 33 days.

The average duration of all cases in 1895, fatal and non-fatal, was: males 31.8 days, females 31.1 days; and for all cases of both sexes, 31.5.

AGE OF OCCURRENCE OF TYPHOID FEVER.

TABLE 12.—*Exhibiting, by Sex, the per cent of persons in certain Age-groups sick from Typhoid Fever in Michigan, during the nine years and each of the nine years, 1887–95; also the average age and the number of cases included. (Compiled from such reports as stated the ages.)*

Year.	Sex.	Average age of persons sick. Years.	No. of cases included.	Age.—In Periods of Years. Per Cent of Cases in each Period of Age.										
				All Ages.	Under 10 Years	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 Years and over.
1887.	Males	24	316	100	10	10	14	20	17	9	8	4	2	4
	Females	22	245	100	17	10	20	15	10	10	5	4	3	5
1888.	Males	24	310	100	12	13	15	20	11	11	5	4	3	6
	Females	23	199	100	12	22	20	14	8	5	4	6	3	7
1889.	Males	24	362	100	13	11	17	25	10	8	6	3	2	6
	Females	23	310	100	16	17	20	12	8	7	7	4	4	5
1890.	Males	22	325	100	14	12	16	25	16	7	4	3	2	3
	Females	20	199	100	16	16	24	17	11	6	5	1	2	4
1891.	Males	23	893	100	11	11	16	26	17	8	4	2	2	3
	Females	23	553	100	13	20	21	15	10	6	3	3	3	5
1892.	Males	23	† 711	100	15	9	17	21	16	7	6	3	2	4
	Females	20	† 506	100	22	16	22	13	8	6	4	4	2	2
1893.	Males	22	1,073	100	20	10	14	20	18	8	5	2	2	2
	Females	17	894	100	21	16	19	16	11	5	3	2	3	4
1894.	Males	23	813	100	21	12	13	17	13	7	9	3	2	3
	Females	22	649	100	22	15	18	11	11	7	5	3	3	4
1895.	Males	22	1,292	100	16	14	13	17	12	9	7	4	3	5
	Females	21	991	100	19	20	17	12	8	7	5	5	2	5
Av. 1887–95.	Males	23	677	100	15	11	15	21	14	8	6	3	2	4
	Females	21	505	100	18	7	20	14	9	7	5	4	3	5

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† In the Annual Report for 1893, the figures given for 1892, in Table 11 (Table 12 in this Report) include only the non-fatal cases of which the age and sex were given; whereas in the reports for 1894-95 *all* cases, both fatal and non-fatal, are included for 1892, as well as for all the other years treated.

TABLE 13.—*Exhibiting, by Sex, the* **Per Cent** *of persons in certain Age-groups who died of Typhoid Fever during each of the years 1892–95; also the per cent the deaths in each group were of all the deaths from Typhoid Fever.*

Year.	Sex.	Average age of decedents. Years.	No. of deaths included.	Per Cent of Deaths in certain Age-groups.*										
				All Ages.	Under 10 years.	10 to 14.	15 to 19	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 Years and over.
1892.	Males	28	116	100	3	6	18	22	22	8	4	5	3	8
	Females...	21	68	100	18	12	31	9	12	7	3	4	1	3
1893.	Males	28	121	100	7	5	11	24	23	13	7	2	2	5
	Females...	23	101	100	13	17	27	11	14	6	3	3	1	6
1894.	Males	26	113	100	15	11	8	20	13	11	9	5	3	5
	Females...	27	97	100	11	9	22	9	14	8	6	7	0	14
1895.	Males	28	176	100	9	8	14	16	12	11	7	6	5	12
	Females..	23	124	100	14	15	17	19	11	4	7	5	4	4
1892–95.	Per cent the deaths in each age-group were of all the deaths.....	------	916	100	11	10	17	17	15	9	6	5	3	7

* In each age-group both years are included.

In studying Tables 12 and 13, and first four lines in Table 14, relative to age of persons who died with or who had typhoid fever, it should be held in mind that there are more persons living in the earlier ages than at the more advanced ages. In the last three lines of Table 14, and in the diagram "Age, distribution," etc., Plate 787, this fact is taken account of, and the diagram graphically exhibits the relative danger of death at each period of life, according to the experience in Michigan in the two years 1892–3, and it is practically the same for the four years 1892–5.

By Table 14 it may be seen, that to males the greater danger of death from typhoid fever was in the age-periods 15 to 30 years, especially in the period 20 to 25 years; the greatest death-rate of females was during the age-period 15 to 20 years.

The average age at death of all persons, both males and females, was 26 years.

TWO LINES OF EVIDENCE OF THE PREVALENCE OF TYPHOID FEVER.

In studying the prevalence of typhoid fever in 1895, from the facts presented in the preceding and following pages, it must be borne in mind that those facts are derived from two distinct sources of information:

1.—The numbers of outbreaks, of cases of sickness, and of deaths from typhoid fever are taken from special reports from health officers and other township, city and village officers, during the course of an outbreak, at its close, or in annual reports at the close of the year. If all the people and officers reported as the law provides, the facts presented would represent the *actual numbers* of outbreaks, cases of sickness, and deaths from typhoid fever which occurred in the State during the year; but *all* do not so report. In Detroit, for instance, only the 61 fatal cases were reported. It is just, however, to state that as the people generally are becoming better instructed in the measures recommended by the State Board of Health for the saving of life and health, better and more complete reports are made year by year. So, each year, we believe that an increasing proportion of the cases of sickness and deaths from the dangerous communicable diseases are reported to this office. This tends toward an apparent increase in the prevalence of the disease each year, modified, of course, by the real fluctuation in prevalence. While waiting for perfect reports, the facts derived from those now received are valuable for purposes of study.

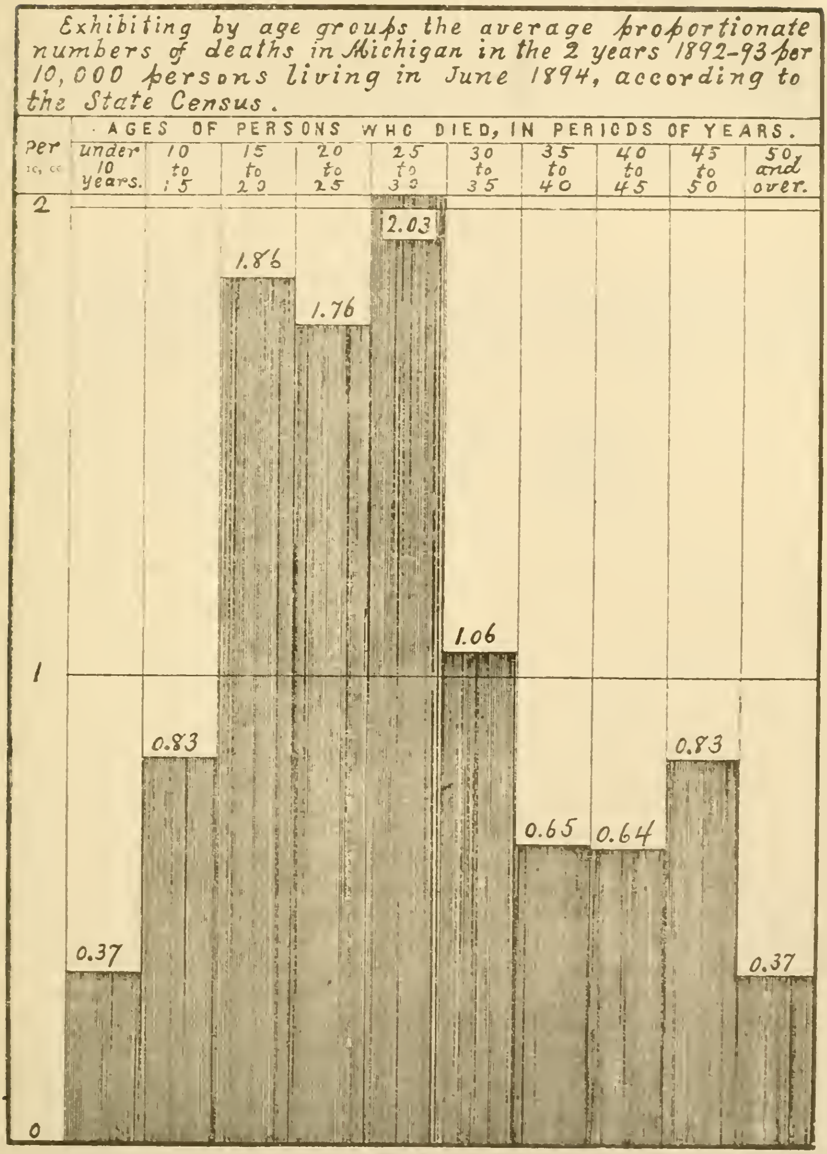
2.—The prevalence of typhoid fever, or any given disease, as indicated by the "per cent of reports" is taken from the weekly postal-card reports from regular correspondents of the State Board, health officers of cities and villages, and others. The "per cent of reports" is the per cent of the whole number of reports received which stated the presence of the disease named; it gives the relative prevalence of the disease, under the observation of the physicians who report. It may represent the relative area of prevalence of the disease, combined with the relative number of weeks the disease continued where it did occur, *but not the number of cases*

TABLE 14.—*Exhibiting by sex, the* **number** *of persons in certain Age-groups who died of Typhoid Fever during each of the four years 1892–5; also by Age-groups, the average number of deaths in the four years, 1892–95, per 10,000 inhabitants.*

				Number of Deaths in Certain Age-groups.*									
Year.	Sex.	Average age of decedents. Years.	No. of Deaths included.	Under 10 Years.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 Years and over.
1892.	Males	28	116	4	7	21	26	25	9	5	6	4	9
	Females	21	68	12	8	21	6	8	5	2	3	1	2
1893.	Males	28	121	8	6	13	29	28	16	9	3	3	6
	Females	23	101	13	17	27	11	14	6	3	3	1	6
1894.	Males	26	113	17	12	9	23	15	12	10	6	3	6
	Females	27	97	11	9	21	9	13	8	6	7	0	13
1895.	Males	28	176	16	14	25	28	21	19	13	11	8	21
	Females	23	124	17	19	21	23	14	5	9	6	5	5
1892-95.	Males	Deaths per 10,000 inhabitants, of the same sex, and age, in each age-group.		.44	.84	1.55	2.53	2.31	1.57	1.14	.97	.78	.61
	Females			.53	1.17	2.06	1.19	1.36	.75	.72	.83	.35	.44
1892-95.	The average number of deaths (both sexes) per 10,000 inhabitants in each age-group for the four years, 1892-95			.48	1.01	1.80	1.86	1.85	1.18	.95	.90	.58	.53

* In each age-group both years are included.

AGE-DISTRIBUTION OF DECEDENTS FROM TYPHOID FEVER.



[PLATE 787.]

The weekly card-reports, however furnish a valuable means of ascertaining, approximately, the relative prevalence of the several diseases in a given year, and the relative prevalence of a given disease in one year compared with other years, and it is as good a scheme for ascertaining the facts as is yet available. Therefore the sickness statistics based upon those weekly card-reports should be relied upon for a comparison of the relative prevalence of typhoid fever in 1895, compared with preceding years. However, the evidence from the two sources may well be compared.

A comparison of the evidence from the two sources just mentioned, relative to typhoid fever during the years, 1885–1895, is facilitated by the following Table 15. It appears that typhoid fever was more prevalent in 1895 than in any other year, more generally spread and more generally reported. A greater number of outbreaks and localities were reported in 1895 than in any other previous year, and a greater number of cases and deaths than any previous year, excepting 1891.

TABLE 15.—*By years for the eleven years 1885–95, and an average for the 9 years 1886–94, the per cent of reports (from regular correspondents to the State Board of Health, and others) stating the presence of Typhoid Fever in Michigan; also, for the same years and period of years, the number of outbreaks, number of localities of outbreaks, the cases of sickness and the deaths reported from Typhoid Fever.*

Years.	Per cent of weekly postal reports stating the presence of typhoid fever.	Reported outbreaks of typhoid fever.	Reported localities of outbreaks of typhoid fever.	Reported cases of sickness from typhoid fever.	Reported deaths from typhoid fever.
1885	8	218	200	715	194
1886	8	290	282	1,194	282
1887	10	335	320	2,424	411
1888	10	316	296	1,511	310
1889	10	432	398	2,530	402
1890	8	330	310	1,924	304
1891	11	543	501	4,670	697
1892	9	527	484	2,591	538
1893	9	545	504	3,512	594
1894	11	600	530	2,805	506
1895	13	800	695	3,751	621
Average 9 Years, 1886–94	10	435	403	2,573	449

Typhoid Fever and Low Water in Wells.

Table 16 exhibits the relation of low water in wells to sickness (as shown by the weekly card-reports) and the reported deaths from typhoid fever in Michigan, for the seventeen years, 1878, 1880–95. The facts similar to those presented in two lines of this table, low water in wells and sickness from typhoid fever, for a ten-year period, are graphically represented in a diagram on page 256 of the Annual Report of this Board for 1889.

The diagram, Plate 681, on a subsequent page of this Report graphically represents the relation of the sickness from typhoid fever, according to the sickness statistics, to the rise and fall of the water in wells, in Michigan for the fourteen-year period comprising the years 1878 and 1880–92.

Table 19 exhibits the average prevalence of typhoid fever in Michigan by year and months for the ten years, 1878–87, and for each of the eleven years, 1885–95, as indicated by the weekly card-reports made by regular observers. Table 20 exhibits the rainfall by months and years for the period of ten years, 1878–87, and for each of the eleven years, 1885–95.

A study of this subject was made by the Secretary of this Board in a paper read before the American Public Health Association, at St. Louis, Mo., Oct. 16, 1884, which was printed in the Annual Report of this Board for the year 1884, pp. 89–114, and the study was continued subsequently, in the Annual Reports of this Board for the years 1888, pp. lv-lvii; 1889, pp. 254–262; 1890, pp. 247–251.

The evidence is conclusive that there is a necessary relation between the low water in wells and sickness from typhoid fever.

The fluctuations in the sickness from typhoid fever and the depth of the water in wells are nearly coincident throughout the several months. The maximum of sickness and the minimum of water are coincident in October.

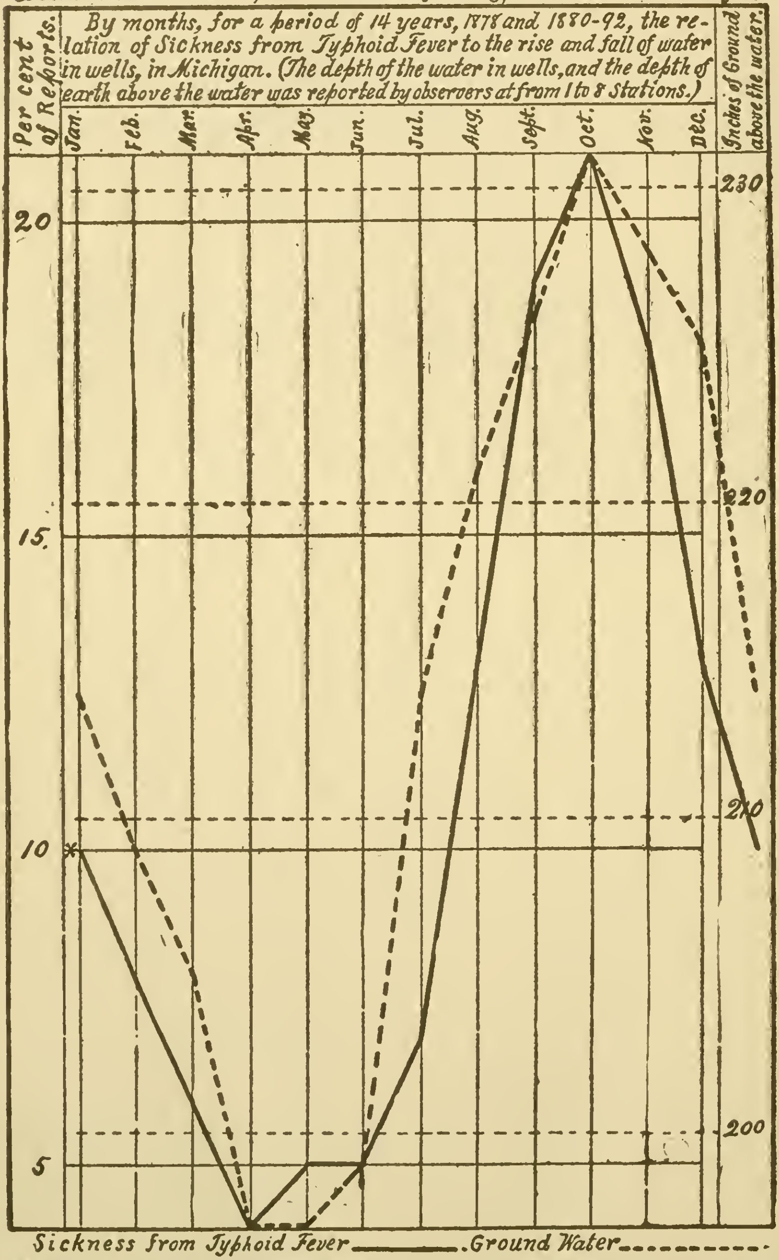
The stations at which the measurements of water in wells are taken and the number of years which are available from each station are stated in the dagger (†) foot note of Table 16, of this article. This office has been unable thus far to get accurate measurements of the height of the water in wells for a long period of years from many stations in Michigan. This absence of extensive data is especially deplored when a comparison of one year with a series of years is desired, but in the averages for a series of years by *months*, the evidence is accurate and valuable.

It is believed that all the wells from which measurements of water are made for this office, except the well at Lansing, are in regular daily use, as supplies of water. The well at Lansing is not so used; it is in the capitol grounds, far enough from other wells so as not to be liable to be affected by the rise and fall of the water in other wells from daily use, and so would more nearly represent the gradual rise and fall of the *ground water* than would measurements in wells from which water is drawn. But it has been found, by long continued observations and investigations of the Michigan sickness statistics, contagious-disease statistics, and the reports relative to water in wells, that the rise and fall of the typhoid fever is in much closer relation to the fall and rise of the water in wells in actual use than to the fluctuations in the well at Lansing.

If it ever comes to pass that typhoid-infected wells in Michigan shall be done away with, and what typhoid fever shall then occur shall be only what is contracted in some other way than by the water supply, then it may reasonably be expected that the relation now apparent between low water in wells and typhoid fever will cease. In fact it is claimed that just this has already occurred in Munich, Bavaria. Therefore it seems quite important that a close watch be kept upon the subject, so that as soon as this relation ceases the other sources of typhoid fever may be searched for, with a view to their removal.

The condition of the well at Lansing, in 1895, which was dry from June to the latter part of December, although there was 19.81 inches of rainfall at that locality during the same period, might have proven of considerable significance but for the fact that the average of earth above the water in wells, reported from stations throughout the State, though considerably higher from August to December than for the remainder of the year, show that they were not dry, and the typhoid fever bears a much closer relation in 1895 to the average height of ground above the water in wells at stations throughout the State, from which reports were received, than the height of ground above the water in the well at Lansing.

Low Water in Wells, and Sickness from Typhoid Fever in Michigan.



By months, for a period of 14 years, 1878 and 1880-92, the relation of Sickness from Typhoid Fever to the rise and fall of water in wells, in Michigan. (The depth of the water in wells, and the depth of earth above the water was reported by observers at from 1 to 8 Stations.)

* Indicating what per cent of all reports received stated the presence of Typhoid Fever then under the observation of the physicians reporting.

The danger from typhoid fever is greatest in October, when the water in wells is lowest, and least in April, when the water in wells is highest.

[Plate 681.]

TABLE 16.—*Exhibiting, for Michigan, by Months, during the seventeen years, 1878, 1880–95,* the relation of low water in wells to sickness from Typhoid Fever; also, the reported number of deaths from Typhoid Fever.*

Conditions.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. inches of ground above the water in wells†	237	231	228	215	217	224	236	242	247	251	249	246
Fluctuation from Maximum Depth of water in wells ‡	22	16	13	......	2	9	21	27	32	36	34	31
Sickness from Typhoid Fever §	9	7	5	4	5	5	7	14	19	22	18	13
Av. number of reported deaths from Typhoid Fever |	27	22	26	26	24	24	29	59	93	106	79	55

*The data relating to the sickness and the deaths from typhoid fever in the years 1878, 1880–95, were used in order to coincide with the same period for which the measurements of ground above the water in wells were already obtained.

†The year 1879 could not be included as, for that year, there was no station from which reports were received for the whole year. The stations used in the compilation of this line, and the years for which reports were received and compiled from each are as follows: Elsie, 1878; Thornville, 1880-1 and 1885-7; Hillsdale, 1880, 1884, 1887-90, 1892-95; Mendon and Union City, 1880; Linden and Dearborn, 1881; Brockway Center, 1882 and 1883; Otisville and Woodland, 1882; Saginaw City, 1883; Kalamazoo, 1884, 1888, and 1889; Lansing, S. B. of H., 1885-95; Ann Arbor, 1886-95; Alpena, 1887-88; Otsego, 1887; Traverse City, 1888-93, 1895; Battle Creek, 1888, 1893-95; River Raisin, 1886-91, 1893-95.

‡The Av. "Max. Depth" was in May, because the "Av. inches of earth above the water," was least in that month.

§Per cent of weekly reports, from observers in different parts of the State, which stated the presence of typhoid fever.

|The data used in the compilation of this line were taken from the Registration Reports of Michigan.—Vital Statistics. No correction has been made for unequal lengths of months.

TABLE 17.—HEIGHT OF GROUND WATER.—*Inches of Earth above the Water—by Months for the eleven years, 1885–95, and for the last four months of the year 1884, and for each of the eleven years, 1885–95; also averages for the nine years, 1886–94, at* **Lansing**, *Mich.,—Well in the Capitol Grounds.*

Period of time.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1885–95	297	299	299	298	294	294	292	294	295	297	300	302	302
1884	......	......	......	......	......	......	......	......	......	290	291	293	292
1885	284	288	289	292	280	281	279	282	283	282	285	281	280
1886	281	276	278	274	272	273	277	282	287	287	286	291	294
1887	290	296	287	280	282	285	288	290	291	291	294	297	294
1888	294	292	298	294	293	293	293	293	290	293	297	294	300
1889	304	298	304	304	302	304	299	299	302	305	308	311	312
1890	300	309	307	305	302	296	292	293	295	300	300	298	300
1891	301	302	305	301	295	294	296	297	300	300	304	306	306
1892	301	308	307	306	305	300	295	293	293	296	300	304	305
1893	295	309	305	304	289	291	284	285	288	293	296	299	292
1894	298	294	293	296	296	294	287	292	296	300	305	313	312
1895*	322	316	319	320	319	322	324	324	324	324	324	324	324
Av. 9 yrs., 1886-94	296	298	298	296	293	293	290	292	294	296	299	302	302

*In 1895, from June to December, the well at Lansing was dry, with the exception of the latter part of December, after the regular time for the observation was past. See §note on p. 17 of this Report.

TABLE 18.—*Exhibiting the number of Inches of Earth above the ground water in Lansing, by months, for each of the ten years 1886-95, compared with the per cent of reported cases and outbreaks of Typhoid Fever in Michigan, for each month; also the total numbers of cases and outbreaks reported for those years. (Compiled from those cases of which the date of occurrence was given; and from those outbreaks of which the time of beginning was stated.)*

Specifications relative to Ground Water and Typhoid Fever.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	No. of cases and outbreaks included in this table.
Inches of earth above the water, year 1886		276	278	274	272	273	277	282	287	287	286	291	294	
Per cent of outbreaks which began in each month, 1886	100	6	4	4	2	2	4	11	15	26	11	11	5	253
Inches of earth above the water, year 1887		296	287	280	282	285	288	290	291	291	291	297	294	
Per cent of cases of typhoid fever reported, year 1887	100	2	1	1	1	2	3	8	20	24	19	12	7	1,096
Per cent of outbreaks which began in each month, 1887	100	5	2	2	3	6	4	12	23	20	11	9	3	289
Inches of earth above the water, year 1888		292	298	294	293	293	293	293	290	293	297	294	300	
Per cent of cases of typhoid fever reported, year 1888	100	5	3	2	3	3	4	7	13	18	23	11	9	609
Per cent of outbreaks which began in each month, 1888	100	7	5	3	3	4	6	12	15	16	15	6	7	265
Inches of earth above the water, year 1889		298	304	304	302	301	299	299	302	305	308	311	312	
Per cent of cases of typhoid fever reported, year 1889	100	1	2	1	2	1	2	4	12	28	24	15	7	1,248
Per cent of outbreaks which began in each month, 1889	100	4	2	3	2	2	5	8	17	21	19	11	6	382
Inches of earth above the water, year 1890		309	307	305	302	296	292	293	295	300	300	298	300	
Per cent of cases of typhoid fever reported, year 1890	100	5	2	2	3	2	2	7	23	18	17	12	6	1,089
Per cent of outbreaks which began in each month, 1890	100	5	4	3	3	6	5	9	25	13	15	6	5	253
Inches of earth above the water, year 1891		302	305	301	295	291	296	297	300	300	304	306	306	
Per cent of cases of typhoid fever reported, year 1891	100	6	2	1	2	2	2	5	14	24	23	13	6	1,464
Per cent of outbreaks which began in each month, 1891	100	6	3	2	3	4	5	8	20	18	19	9	4	454
Inches of earth above the water, year 1892		308	307	306	305	300	295	293	293	296	300	304	305	
Per cent of cases of typhoid fever reported, year 1892	100	5	4	5	5	3	4	5	8	17	22	13	9	2,482
Per cent of outbreaks which began in each month, 1892	100	10	3	3	3	4	5	8	16	16	15	7	9	462
Inches of earth above the water, year 1893		309	305	304	298	291	284	285	288	293	296	299	292	
Per cent of cases of typhoid fever reported, year 1893	100	2	2	3	2	5	13	8	15	18	15	10	6	2,237
Per cent of outbreaks which began in each month, 1893	100	8	3	3	3	3	8	7	16	20	15	8	5	469
Inches of earth above the water, year 1894		294	293	296	296	294	287	292	296	300	305	313	312	
Per cent of cases of typhoid fever reported, year 1894	100	4	3	2	2	2	3	4	9	20	24	18	8	2,805
Per cent of outbreaks which began in each month, 1894	100	7	3	2	5	4	6	8	19	17	17	9	4	527
Inches of earth above the water, year 1895		316	319	320	319	322	324	324	324	324	324	324	324	
Per cent of cases of typhoid fever reported, year 1895	100	3	3	2	2	2	3	5	12	22	33	26	14	3,751
Per cent of outbreaks which began in each month, 1895	100	5	3	2	3	2	4	9	19	21	21	7	4	716

TABLE 19.—Typhoid Fever in Michigan.—*Average per cent of weekly card-reports stating the presence of Typhoid Fever, by year and Months for the Ten years, 1878–87, and in each of the eleven years, 1885–95; also, the average for the nine years, 1886–94.*

Period of time.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. 10 yrs., 1878-87*	12	10	9	7	5	5	5	7	14	20	22	20	14
1885	† 8	11	7	5	4	3	5	5	6	11	13	16	8
1886	† 8	6	3	4	3	5	4	5	13	16	16	13	10
1887*	10	6	10	4	3	3	4	8	14	22	18	15	11
1888	10	10	7	6	5	4	5	7	12	18	16	12	10
1889	10	8	5	3	3	4	5	5	12	19	25	19	12
1890	8	6	1	2	2	2	5	6	15	15	16	13	7
1891	11	5	5	2	2	3	3	6	12	21	27	21	15
1892	9	7	5	4	4	3	4	5	13	16	17	11	12
1893	9	6	4	3	3	4	6	7	12	16	23	20	8
1894	11	7	5	4	2	6	5	7	15	23	24	17	13
1895	13	8	5	5	8	3	3	13	19	23	31	24	14
Av. 9 yrs., 1886-94	10	7	5	4	3	4	5	6	13	18	20	16	11

* The figures in the line for 1887, and in the line for the average for the ten years, 1878–87, in this table do not all exactly agree with those in the same lines in the table printed on page lvi. of the report of this Board for the year 1888, for the reason that the table printed in the Report for 1888 was made before the cards were all compiled for the *year*, and was taken from the compilation (of the card reports first received) for the quarterly reports. The line "Average 10 years 1878–87," included the data for the year 1887 and consequently is not exactly, although it is substantially, the same as in the above table.

† Since May, 1885, physicians have reported only the prevalence of diseases under their *own observation*. Previous to that time diseases which were *believed* to be present (under the care of other physicians) were so reported. This undoubtedly accounts for a part of the sudden decrease in 1885 and 1886 as compared with the preceding years.

TABLE 20.—Rainfall in Michigan.—*Average number of Inches, by Months, for the ten years, 1878–87, and in each of the eleven years, 1885–95; also averages for the nine years, 1886–94.*

Period of time.	Year.	Jan.	Feb.	Mar.	Apr	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Av. ten yrs., 1878-87	37.27	2.09	2.89	2.28	2.49	3.52	4.24	3.44	3.21	3.72	3.45	2.98	2.69
1885	35.82	2.70	.73	.58	2.47	2.30	6.01	2.52	5.82	3.75	3.08	2.90	2.14
1886	32.16	3.05	1.72	2.74	2.40	2.58	2.29	1.36	4.21	5.36	1.97	2.35	2.13
1887	29.81	2.57	4.40	1.08	1.69	2.35	2.62	2.51	1.86	3.12	2.69	2.00	2.92
1888	29.57	1.99	1.77	2.51	2.15	3.73	2.87	2.02	2.38	2.66	2.68	2.92	1.89
1889	28.18	2.42	2.04	1.01	1.62	4.21	3.82	3.07	.98	1.85	1.10	3.10	2.96
1890	36.25	3.53	2.40	2.12	3.37	4.80	3.74	1.47	3.63	2.09	4.97	2.43	1.70
1891	31.66	1.91	3.13	2.74	2.03	1.33	2.53	2.55	4.41	1.92	1.71	4.86	2.54
1892	33.09	1.95	2.16	1.39	2.16	5.45	5.17	2.39	2.92	3.01	1.40	3.14	1.95
1893	36.35	2.34	2.78	2.40	4.77	2.91	3.55	2.83	1.22	2.52	4.24	3.05	3.74
1894	28.74	1.77	1.66	2.09	2.46	6.52	2.76	1.30	.72	3.13	2.76	2.02	1.55
1895	27.06	2.95	0.72	0.97	1.51	3.04	1.34	1.47	3.23	2.53	1.18	3.48	4.65
Av. 9 yrs., 1886-94	31.76	2.39	2.45	2.01	2.52	3.76	3.26	2.17	2.48	2.85	2.61	2.87	2.38

TABLE 21.—TEMPERATURE OF THE WATER *in the Well at the State Capitol in* **Lansing,** *Mich., by Months for the eleven years, 1885-95, and the last four months of the year 1884; also averages for the nine years, 1886-94.*

Year and period of years.	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1884	------	------	------	------	------	------	------	------	------	50	51	51	49
1885	47	49	47	43	42	46	48	47	48	50	50	51	45
1886	48	49	47	46	45	46	46	47	50	52	52	51	50
1887	48	50	41	42	46	47	48	49	51	50	51	52	51
1888	49	50	49	48	47	48	48	47	50	51	51	52	51
1889	50	50	49	49	48	49	49	50	50	50	51	51	51
1890	50	50	49	49	48	49	49	49	50	51	51	52	51
1891	50	50	49	49	48	49	49	49	50	51	51	51	51
1892	50	50	50	49	49	49	50	49	50	51	53	52	52
1893	50	50	48	47	48	48	49	49	50	51	52	52	51
1894	51	51	50	49	49	49	49	50	50	52	52	53	52
1895*	49	51	46	48	50	49	------	------	------	------	------	------	*51
Av. 9 yrs., 1886-94	50	50	48	48	48	48	49	49	50	51	52	52	51

* In 1895, from June to December the well at Lansing was dry, therefore the temperature for the year is taken from the six months when there was water in the well, viz.: Jan., Feb., Mar., Apr., May, and the latter part of Dec. See § note, p. 17 of this Report.

TABLE 22.—*Sickness from Typhoid Fever in Michigan (as indicated by the weekly card-reports by all observers) and the depth of earth (in inches) above the water in the well, and the temperature of the water in the well at* **Lansing,** *Michigan, averages by Year and Months for the nine years, 1886-94.*

	Year.	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Sickness from Typhoid Fever*	10	7	5	4	3	4	5	6	13	18	20	16	11
Inches of earth above water in well†	296	298	298	296	293	293	290	292	294	296	299	302	302
Temperature of water in well‡	50	50	48	48	48	48	49	49	50	51	52	52	51

* Per cent of all reports received (from observers in different parts of the State) which stated the presence of typhoid fever, from last line in Table 19.

† This line is copied from the last line in Table 17.

‡ This line is copied from the last line in Table 21.

TABLE 23.—*Exhibiting the Average Total Annual Rainfall at Stations in Michigan, the same for Lansing, the inches of earth above the ground water at Lansing, the inches of water in an undisturbed well at Lansing, and the reported sickness, from Typhoid Fever in Michigan, as indicated by the per cent of all the weekly card-reports which stated the presence of Typhoid Fever, during each of the 11 years, 1885–95, and averages for the 9 years, 1886–94.*

Year, and period of years.	Average total Annual Rainfall at Stations in Michigan, in inches.	Total Annual Rainfall at Lansing in inches.	Inches of earth above the Ground Water at Lansing.	Inches of water in an unused well at Lansing.	Ground Water higher (+) or lower (—) than the nine years' Average in inches.	Average Per Cent of all weekly card-reports stating the presence of Typhoid Fever.	More (+) or less (—) Sickness From Typhoid Fever than the nine years' Average.
1885	35.82	34.51	284	40	+12	8	—1
1886	32.16	29.52	281	43	+15	8	—1
1887	29.82	30.08	290	34	+6	10	+1
1888	29.55	25.76	294	30	+2	10	+1
1889	28.18	23.28	304	20	—8	10	+1
1890	30.20	35.96	300	24	—4	8	—1
1891	31.66	29.05	301	24	—4	11	+2
1892	33.08	31.97	301	23	—5	9	=
1893	36.34	39.52	295	29	+1	9	=
1894	28.74	24.96	298	26	—2	11	+2
1895	27.06	27.52	322	5	—23	13	+3
Av. 9 yrs., 1886–94	31.08	29.79	296	28		10	

WHOOPING-COUGH IN MICHIGAN DURING THE YEAR ENDING DECEMBER 31, 1895.

During the year ending December 31, 1895, there were reported to the Secretary of the State Board of Health, 242 outbreaks of whooping-cough in 240 localities in Michigan, which resulted in 4,284 cases and 109 deaths, with an average of 17.9 cases and .45 of one death per locality. The death-rate from this disease for the State in 1895, according to reports to this Office, was .48 of one death per 10,000 inhabitants.

TABLE 1.—*Whooping-cough in Michigan for the nine years, 1887–95. Exhibiting the numbers of reported cases and deaths and the number of localities in which the presence of the disease was reported, together with the cases and deaths per locality and per 100,000 inhabitants, and the per cent the deaths were of cases. (Compiled from reports received at the Office of the Secretary of the State Board of Health.)*

Years.	Cases.	Deaths.	Localities.	Cases per Locality.	Deaths per Locality.	Cases per 100,000 Inhabitants.	Deaths per 100,000 Inhabitants.	Per cent deaths were of Cases.
1887....	2,267	59	162	16.	.36	115	3.	3.
1888....	2,502	49	161	15.5	.3	124	2.4	2.
1889....	2,694	41	139	19.	.3	131	2.	2.
1890....	983	20	93	10.6	.2	47	1.	2.
1891....	2,360	101	162	14.6	.6	111	5.	4.
1892....	3,188	77	191	16.7	.4	147	3.5	2.
1893....	4,047	134	214	18.9	.63	184	6.	3.
1894....	4,555	123	241	18.9	.51	203	5.5	3.
1895....	4,284	*109	240	17.9	.45	188	4.8	3.
Totals, 1887-95.	26,880	713	1,603	------------	------------	------------	------------	------------
Av. for 9 years.	2,987	79	178	16.8	.44	140	3.7	3.

* In many instances only the fatal cases were reported to this Office.

The sources of contagion were reported as follows:—In 2 instances, attributed to "Catching cold" and "Exposure to cold," in 7 instances, "Contracted at school," in 2 instances, "Changeable weather," in 1 instance, "Sporadic," in 3 instances, each, "Exposure" and "Epidemic," in 6 instances, "Contagion," in 41 instances, attributed to an outside jurisdiction, in 83 instances the source of contagion was reported as "Unknown," and in 94 instances no statement was made regarding the source of contagion. Of the 4,284 reported cases, 192 cases were reported traced to a former case of the disease and 50 cases were reported probably traced to a former case. That so few cases, comparatively, were traced to former cases, and that the disease was attributed to exposure to cold etc., seem to indicate that the specific character of the disease is not generally constantly held in mind, and that not much effort is generally made to trace the spread of the disease, which is probably always caused by a specific micro-organism, which might not always gain entrance to the body except through the influence of cold dry air in irritating the throat and air-passages.

In the foregoing table, it appears that since 1890 the *reported* sickness from this disease has increased. The increase, however, is doubtless due to the fact that each succeeding year brings a greater number of more complete and carefully-prepared reports from health officers and clerks.

While possibly not half the cases and deaths are reported to this office, greater precautions are now taken against the spread of the contagion than were taken even a year ago. The dissemination, by the State Board of Health, of literature among the people, and the constant instructions by the Secretary of the State Board to local health officers that whooping-cough is a "disease dangerous to public-health," causing as much sickness as measles and more deaths than small-pox, has done a great deal to bring about greater precautions in dealing with sickness from whooping-cough.

The following letter, dated Sept. 16, 1895, from Dr. E. B. Patterson, health officer of Michigamme Tp., Marquette Co., shows some of the difficulties in restricting this disease in many localities:—

"I am in receipt of your two communications relative to 'Whooping Cough.' My failure to reply was not from any unwillingness to do so nor from any lack of appreciation of the importance of this disease among children, but rather from an inability to give you information even approximating correctness. I am aware that there are a few cases of the disease mentioned here, but I have not been called upon to see a single case. I do not know how I could comply with your request without a house to house canvass and even then the chances would be against my learning anything reliable, as many of our foreign population would not know what I was asking about, and would not know the whooping from any other cough—so little attention do they pay to their children.

"If I understand the literature you have sent, I infer that you expect placarding, isolation and quarantine in these cases. While this might all be very well in a different locality amongst more educated people, it really does not seem at all practicable here—for while there might be one case that you might catch there would be a dozen cases that I would never know of for the simple reason that ordinarily the children are not sick enough to have the parent take any notice of it.

"Please do not regard this letter as urging any objection to your regulations or as an expression of any unwillingness on my part to give you the data requested—it is simply how the matter looks to me *here*."

Secretary Baker replied, Sept. 17, 1895, as follows:—

"Please accept cordial thanks for your letter of Sept. 16, relative to whooping-cough. I somewhat realize the troubles you meet with as health officer. However, I trust that you will do the best you can under the circumstances. Possibly this Office may coöperate with you so as to build up the public opinion on the subject of the danger from whooping-cough, and best methods for its restriction. We publish leaflets like those sent to you by this mail, in several languages—French, Swedish, Danish, Norwegian, Polish, English. I can send you some of any of those if you can use them for the benefit of the public health."

CONSUMPTION IN MICHIGAN—YEAR ENDING DECEMBER 31, 1895.

During the year ending December 31, 1895, there were reported to the Secretary of the State Board of Health 2,068 cases and 1,613 deaths from consumption in Michigan. These reports were received from 626 localities in the State. This is probably less than the actual number of consumption-infected localities in Michigan, much less than the actual number of deaths, and very much less than the actual number of cases. Many cases are of long duration, and in the early stages and sometimes in the latest stages are not under the care of a physician, as a consequence many of these cases are not reported. From many localities only the deaths from consumption are reported; therefore the apparent ratio of deaths to cases is much too high.

For the year 1895 there were reported to the Secretary of State 2,396 deaths from consumption, or 783 more than were reported to this Office; and the Secretary of the State Board of Health has estimated that the deaths returned to the Secretary of State should be increased by forty per cent to make them equal the number which actually occur.*

CONSUMPTION IN 1895, COMPARED WITH 1893 AND 1894.

According to the reports made to the Secretary of the State Board of Health.

The compilation of information relative to the prevalence of consumption in Michigan, as reported to the Office of the Secretary of the State Board of Health, was made for the first time for the year 1893. Table 1 shows the reported numbers of cases and deaths from consumption, the number of localities where the disease was reported present, the average numbers of cases and deaths per locality, and the deaths per 100 cases, for the years 1893–95. There were more localities, cases and deaths reported in 1895 than in 1893 or in 1894; this annual increase will probably continue until the *reported* numbers quite nearly agree with the *actual* numbers of infected localities, and of the cases and deaths which occur.

According to the reports made to the Secretary of State.

The reports to the Secretary of the State Board of Health, while useful for many purposes, are not yet useful for comparing the deaths in one year with the deaths in another year, for reasons already stated. On the other hand, not all deaths are reported to the Secretary of State, but probably the omissions are about the same in every year, therefore the statistics of the State Department are useful for comparing one year with another.

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* According to this estimate, there were 3,354 death from consumption in Michigan in 1895. Williams states that the average duration of fatal cases of consumption under his observation in England was 7 years 8.72 months; if the duration of fatal cases in Michigan is the same as that stated for England, there were about 25.926 cases of consumption in the State in 1895, or 1.14 per cent of the population are consumptives.

TABLE 1.—Consumption in Michigan.—*Numbers of reported cases and deaths, Number of Localities in which they occurred, Average number of cases and deaths per locality, and the per cent of cases which proved fatal, as reported for each of the three years, 1893–95.*

Year.	Reported localities.	Reported cases.	Average cases per locality.	Reported deaths.	Average deaths per locality.	Deaths per 100 cases.
1893	525	1,988	3.8	1,509	2.9	75.9
1894	590	2,060	3.5	1,581	2.7	76.7
1895	626	2,068	3.3	1,613	2.6	78.0

The following table (2) stating the number of deaths from consumption per 100,000 persons living, reported to the Secretary of State, probably quite accurately represents the annual fluctuations of, but not the total deaths from consumption in Michigan during the 27 years, 1869–95.

TABLE 2.—*Exhibiting the number of reported deaths from Consumption per 100,000 persons living in Michigan in each of the 27 years, 1869–95. Compiled from the Secretary of State's Vital Statistics of Michigan. (Population for intercensal years estimated by average annual increase, by Dr. Wilbur, Chief of Vital Statistics in State Department except for the year 1895 which was estimated in the Office of the State Board of Health.)*

Year.	1869.	1870.	1871.	1872.	1873.	1874.	1875.	1876	1877.	1878.	1879.	1880.	1881.
Deaths	108.1	122.5	106.0	115.1	109.6	102.0	104.9	109.2	110.9	106.1	105.6	111.7	116.1

Year.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.
Deaths	104.4	112.3	120.8	105.3	107.3	108.7	121.0	104.3	105.4	96.3	95.2	97.7	98.4	105.1

A diagram graphically representing the figures shown in Table 2, for the 24 years, 1869–92, is printed on page 425 of the Annual Report of this Board for 1895.

By Table 2, it may be seen that there was a marked decrease in the death-rate from consumption in 1889 as compared with the previous year, this was followed by a slight rise in 1890. In 1891 there was another decided decrease in the death-rate from consumption in Michigan. The first mentioned decrease may be only the usual inter-epidemic period. The second one is remarkable as it was the first time that the disease had ever decreased so much, and it occurred at a time when influenza was epidemic in this country, and the statistics for the eastern States show an increase in the death-rate from consumption, which increase was attributed to the influence of the epidemic influenza.

It is possible that the decrease in the death-rate from consumption in Michigan beginning in 1891 and continuing in 1892–3–4 was due to the efforts of the State Board of Health to educate the people in methods of restricting the disease. Those efforts are mentioned on page 426, Annual Report of this Board for 1895. Alternative suppositions are (1) that the decrease in the death-rate from consumption was caused by the attributing of a large number of deaths of consumptives to influenza, in the years 1891–2–3–4, and (2) that many who otherwise would have died from consumption in those years actually died of influenza in 1891. Possibly all three of these supposed causes may have contributed.

DISTRIBUTION OF CONSUMPTION BY DIVISIONS AND COUNTIES DURING 1895.

TABLE 3.—*Exhibiting the Population of Michigan for the year 1895, by tiers of counties (Upper Peninsula as one tier); also the number of cases of and deaths from Consumption* REPORTED *to the State Board of Health from each of these divisions for 1895, and the number of cases and deaths per 10,000 population of each division.*

Counties in Groups, most Northern ones First.			Estimated Population, 1895.*	Reported Cases of Consumption, 1895.	Average Reported Cases per 10,000 Population.	Reported Deaths from Consumption, 1895.	Reported Deaths from Consumption per 10,000 Population.
State			2,278,579	2,068	9.08	1,613	7.08
Upper Peninsula	Alger. Delta. Schoolcraft. Luce. Houghton. Ontonagon. Gogebic. Baraga.	Mackinac. Chippewa. Keweenaw. Marquette. Iron. Menominee. Dickinson.	213,073	135	6.34	81	3.80
Eleventh tier of counties	Emmet. Charlevoix.	Cheboygan. Presque Isle.	43,372	22	5.07	14	3.23
Tenth tier of counties	Leelanaw. Antrim. Otsego. Montmorency.	Alpena.	48,721	24	4.93	16	3.28
Ninth tier of counties	Benzie. G'd Traverse. Kalkaska.	Crawford. Oscoda. Alcona.	42,933	52	12.11	39	9.08
Eighth tier of counties	Manistee. Wexford. Missaukee. Roscommon.	Ogemaw. Iosco.	67,590	52	7.69	40	5.92
Seventh tier of counties	Mason. Lake. Osceola. Clare.	Gladwin. Bay. Huron. Arenac.	157,735	167	10.59	115	7.29
Sixth tier of counties	Oceana. Newaygo. Mecosta. Isabella.	Midland.	92,559	59	6.37	47	5.78
Fifth tier of counties	Muskegon. Montcalm. Gratiot. Saginaw.	Tuscola. Sanilac.	250,905	197	7.85	146	5.82
Fourth tier of counties	Ottawa. Kent. Ionia. Clinton.	Shiawassee. Genesee. Lapeer. St. Clair.	384,315	368	3.51	288	7.49
Third tier of counties	Allegan. Barry. Eaton. Ingham.	Livingston. Oakland. Macomb.	231,765	176	7.59	132	5.70
Second tier of counties	Van Buren. Kalamazoo. Calhoun. Jackson.	Washtenaw. Wayne.	514,449	584	11.35	517	10.05
First tier of counties	Berrien. Cass. St. Joseph. Branch.	Hillsdale. Lenawee. Monroe.	231,167	232	10.04	178	7.70

* Population estimated by average annual increase (arithmetical method), based on U. S. Census of 1890 and the State Census of 1894. Computed in the Office of the State Board of Health.

Table 3 exhibits, by divisions of the State, the distribution of consumption in 1895, reported to the Secretary of the State Board of Health. Table 4 and the accompanying map exhibit, in slightly different ways, the reported consumption during the year 1895, by counties. The tables exhibit the death-rates as well as the reported cases and deaths.

TABLE 4.—*Numbers of Cases and Deaths reported from* Consumption *per 10,000 persons living in each county in Michigan during the year 1895. (Compiled from reports of health officers, clerks, etc.)*

Counties.	Estimated population for 1895.*	Number of reported		Number per 10,000 population, of		Counties.	Estimated Population for 1895.*	Number of reported		Number per 10,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.			Cases.	Deaths.	Cases.	Deaths.
State	2,278,579	2,068	1,613	9.08	7.08	Keweenaw	2,783	1	1	3.60	3.60
Alcona	5,420	8	5	14.76	9.54	Lake	5,745	6	4	10.44	6.96
Alger	1,422	3	2	21.10	14.06	Lapeer	28,795	27	17	9.38	5.90
Allegan	39,246	28	23	7.13	5.86	Leelanaw	9,938	3	1	3.02	1.01
Alpena	18,251	10	7	5.48	3.84	Lenawee	48,564	26	20	5.35	4.11
Antrim	12,931	11	8	8.56	6.20	Livingston	20,332	17	13	8.36	6.39
Arenac	7,258	4	4	5.51	5.51	Luce	2,321	1	1	4.32	4.32
Baraga	4,531	1	1	2.21	2.21	Mackinac	7,089	10	4	14.10	5.64
Barry	23,678	28	19	11.82	8.02	Macomb	32,531	22	20	6.76	6.15
Bay	62,527	99	57	15.83	9.12	Manistee	26,585	24	20	9.03	7.52
Benzie	8,770	11	10	12.54	11.40	Marquette	38,490	31	21	8.05	5.46
Berrien	46,723	42	26	9.42	5.56	Mason	18,931	20	20	10.56	10.56
Branch	26,061	42	39	16.12	14.96	Mecosta	20,987	22	15	10.50	7.15
Calhoun	48,465	38	29	7.84	5.98	Menominee	24,041	17	12	7.07	4.99
Cass	21,232	23	18	10.83	8.50	Midland	13,858	8	7	5.76	5.06
Charlevoix	11,464	10	7	8.72	6.10	Missaukee	7,432	5	5	6.73	6.73
Cheboygan	14,379	4	3	2.80	2.09	Monroe	33,392	23	20	6.88	5.99
Chippewa	16,148	7	6	4.33	3.72	Montcalm	34,538	34	27	9.84	7.86
Clare	8,081	6	6	7.42	7.42	Montmorency	2,676	0	0	0	0
Clinton	26,200	20	9	7.63	3.43	Muskegon	36,652	42	38	11.19	10.37
Crawford	2,647	8	5	30.22	19.00	Newaygo	18,787	9	7	4.79	4.25
Delta	20,245	4	3	2.00	1.48	Oakland	43,034	33	21	7.67	4.88
Dickinson	14,887	12	5	8 06	3.36	Oceana	16,824	9	8	5.35	4.76
Eaton	32,749	17	7	5.20	2.14	Ogemaw	5,652	3	3	5.31	5.31
Emmet	11,312	6	4	5.21	3.53	Ontonagon	7,652	1	1	1.31	1.31
Genesee	40,834	41	28	10.04	6.86	Osceola	16,936	14	12	8.27	7.08
Gladwin	5,073	6	5	11.83	9.86	Oscoda	1,781	1	1	5.61	5.61
Gogebic	14,312	10	10	7.00	7.00	Otsego	4,925	0	0	0	0
G'd Traverse	18,555	18	14	9.10	7.55	Ottawa	40,014	18	14	4.50	3.50
Gratiot	28,803	27	18	9.37	6.25	Presque Isle	6,217	2	0	3.22	0
Hillsdale	30,175	33	21	10.93	6.96	Roscommon	1,563	0	0	0	0
Houghton	46,338	28	9	6.04	1.94	Saginaw	81,740	33	22	4.04	2.69
Huron	33,184	12	7	3.62	2.11	Sanilac	34,284	18	11	5.25	3.21
Ingham	40,195	31	29	7.71	7.21	Schoolcraft	7,454	8	4	10.73	5.36
Ionia	35,325	48	34	13.59	9.62	Shiawassee	33,330	22	12	6.60	3.60
Iosco	11,619	4	3	3.44	2.58	St. Clair	54,875	33	23	6.01	4.20
Iron	5,360	1	1	1.87	1.87	St. Joseph	25,020	43	34	17.19	13.59
Isabella	22,103	11	10	5.00	4.52	Tuscola	34,888	43	30	12.33	8.60
Jackson	46,911	15	14	3.20	2.97	Van Buren	31,189	37	20	11.86	6.41
Kalamazoo	42,752	53	33	12.40	7.72	Washtenaw	43,834	24	16	5.47	3.65
Kalkaska	5,760	6	4	10.42	6.94	Wayne	301,298	417	405	13.84	13.44
Kent	124,942	159	151	12.73	12.08	Wexford	14,739	16	9	10.86	6.11

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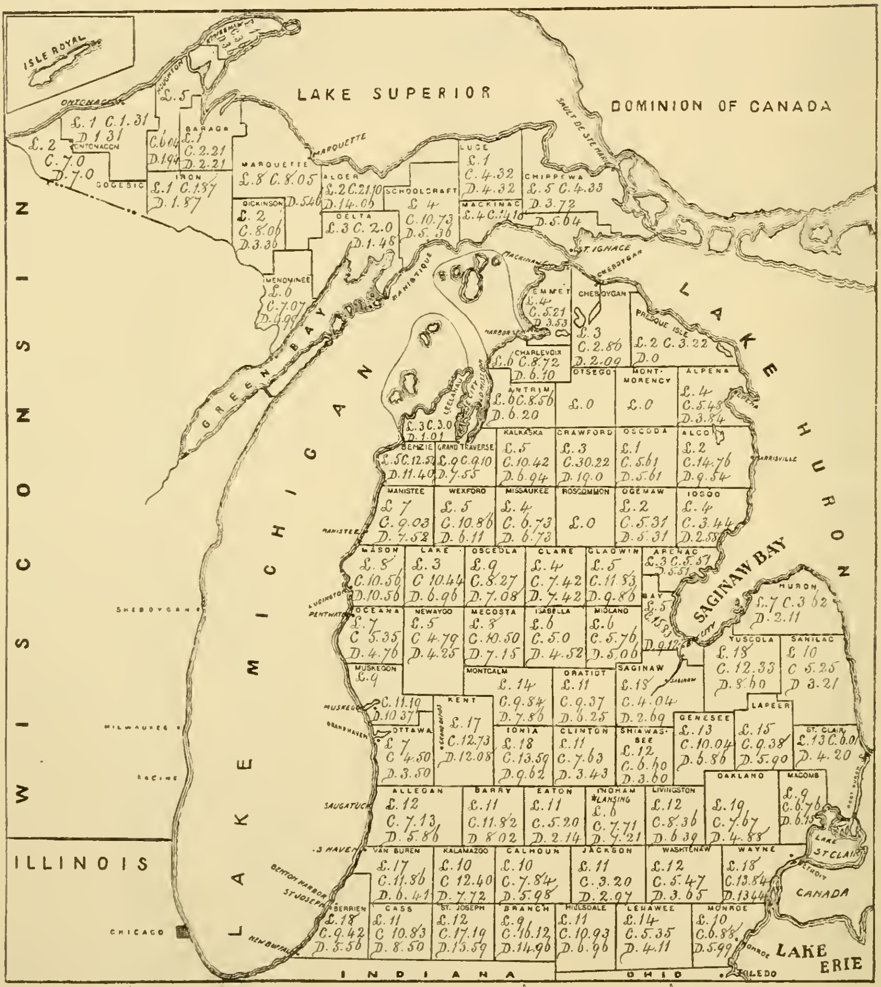
* Population estimated by average annual increase (arithmetical method) based on U. S. Census of 1890 and the State Census of 1894. Computed in the Office of the State Board of Health.

DISTRIBUTION OF CONSUMPTION IN MICHIGAN IN 1895.
BY COUNTIES, THE REPORTED CASES AND DEATHS PER 10,000 INHABITANTS.


ISLE ROYAL
LAKE SUPERIOR
DOMINION OF CANADA
SAULT DE STE MARIE
KEWEENAW
HOUGHTON L.5
ONTONAGON L.1 C.1.31 D.1.31
GOGEBIC L.2 C.7.0 D.7.0
BARAGA L.1 C.2.21 D.2.21
C.6.04 D.1.94
IRON L.1 C.1.87 D.1.87
MARQUETTE L.8 C.8.05 D.5.46
DICKINSON L.2 C.8.06 D.3.36
ALGER L.2 C.21.10 D.14.06
DELTA L.3 C.2.0 D.1.48
SCHOOLCRAFT L.4 C.10.73 D.5.36
LUCE L.1 C.4.32 D.4.32
CHIPPEWA L.5 C.4.33 D.3.72
MACKINAC L.4 C.11.10 D.5.64
MENOMINEE L.6 C.7.07 D.4.99
MANISTIQUE
MACKINAW
ST. IGNACE
GREEN BAY
EMMET L.4 C.5.21 D.3.53
HARBOR SPRINGS
CHEBOYGAN L.3 C.2.86 D.2.09
PRESQUE ISLE L.2 C.3.22 D.0
CHARLEVOIX L.6 C.8.72 D.6.10
OTSEGO L.0
MONTMORENCY L.0
ALPENA L.4 C.5.48 D.3.84
ANTRIM L.6 C.8.56 D.6.20
LEELANAU L.3 C.3.0 D.1.01
BENZIE L.5 C.12.51 D.11.40
GRAND TRAVERSE L.9 C.9.10 D.7.55
KALKASKA L.5 C.10.42 D.6.94
CRAWFORD L.3 C.30.22 D.19.0
OSCODA L.1 C.5.61 D.5.61
ALCONA L.2 C.14.76 D.9.54
HARRISVILLE
MANISTEE L.7 C.9.03 D.7.52
WEXFORD L.5 C.10.86 D.6.11
MISSAUKEE L.4 C.6.73 D.6.73
ROSCOMMON L.0
OGEMAW L.2 C.5.31 D.5.31
IOSCO L.4 C.3.44 D.2.58
MASON L.8 C.10.56 D.10.56
LAKE L.3 C.10.44 D.6.96
OSCEOLA L.9 C.8.27 D.7.08
CLARE L.4 C.7.42 D.7.42
GLADWIN L.5 C.11.83 D.9.86
ARENAC L.3 C.5.57 D.5.57
BAY L.5 C.11.59 D.9.12
SAGINAW BAY
HURON L.7 C.3.62 D.2.11
LUDINGTON
PENTWATER
OCEANA L.7 C.5.35 D.4.76
NEWAYGO L.5 C.4.79 D.4.25
MECOSTA L.8 C.10.50 D.7.15
ISABELLA L.6 C.5.0 D.4.52
MIDLAND L.6 C.5.76 D.5.06
TUSCOLA L.18 C.12.33 D.8.60
SANILAC L.10 C.5.25 D.3.21
MUSKEGON L.9 C.11.19 D.10.37
MONTCALM L.14 C.9.84 D.7.86
GRATIOT L.11 C.9.37 D.6.25
SAGINAW L.18 C.4.04 D.2.69
KENT L.17 C.12.73 D.12.08
GRAND RAPIDS
GRAND HAVEN
OTTAWA L.7 C.4.50 D.3.50
IONIA L.18 C.13.59 D.9.62
CLINTON L.11 C.7.63 D.3.43
SHIAWASSEE L.12 C.6.60 D.3.60
GENESEE L.13 C.10.04 D.6.86
LAPEER L.15 C.9.38 D.5.90
ST. CLAIR L.13 C.6.01 D.4.20
PORT HURON
SAUGATUCK
ALLEGAN L.12 C.7.13 D.5.86
BARRY L.11 C.11.82 D.8.02
EATON L.11 C.5.20 D.2.14
INGHAM LANSING L.6 C.7.71 D.7.21
LIVINGSTON L.12 C.8.36 D.6.39
OAKLAND L.19 C.7.67 D.4.88
MACOMB L.9 C.6.76 D.6.15
S. HAVEN
VAN BUREN L.17 C.11.86 D.6.41
KALAMAZOO L.10 C.12.40 D.7.72
CALHOUN L.10 C.7.84 D.5.98
JACKSON L.11 C.3.20 D.2.97
WASHTENAW L.12 C.5.47 D.3.65
WAYNE L.18 C.13.84 D.13.44
LAKE ST. CLAIR
DETROIT
CANADA
BENTON HARBOR
ST. JOSEPH
NEW BUFFALO
BERRIEN L.18 C.9.42 D.5.56
CASS L.11 C.10.83 D.8.50
ST. JOSEPH L.12 C.17.19 D.13.59
BRANCH L.9 C.16.12 D.14.96
HILLSDALE L.11 C.10.93 D.6.96
LENAWEE L.14 C.5.35 D.4.11
MONROE L.10 C.6.88 D.5.99
MONROE
TOLEDO
LAKE ERIE
LAKE MICHIGAN
LAKE HURON
WISCONSIN
SHEBOYGAN
MILWAUKEE
RACINE
CHICAGO
ILLINOIS
INDIANA
OHIO

L.= Localities; C.= Cases per 10,000 population, D.= Deaths per 10,000 population.

[PLATE 889]

Sickness-rates from reported Consumption in 1895.

Table 3 exhibits the latitudinal distribution of the reported consumption throughout the State, by tiers of counties; all the counties of the Upper Peninsula considered as one tier. By this table (3), it appears that the lowest sickness-rate (3.51 per 10,000 of population) was in the fourth tier, the tenth tier was next in lowest sickness-rate. The tier of counties having the greatest sickness-rate (12.11 per 10,000 population) was the ninth. Other tiers in which the sickness-rates were above the average, were the second with 11.35; the seventh with 10.59, and the first with 10.04 cases per 10,000 inhabitants.

Table 4 shows by counties the sickness-rates in the State. The greatest sickness-rate from reported consumption in 1895 was in Crawford county, where the ratio of cases to population was 30.22 to 10,000. Other counties where the sickness-rates were largely in excess of the average rate for the State, were: Alger, 21.10; St. Joseph, 17.19; Branch, 16.12; Bay, 15.83; Alcona, 14.76, and Mackinac 14.10 cases per 10,000 of population. The lowest sickness-rate from reported consumption (where such sickness occurred) for the year, 1.31 cases per 10,000 of population, was in Ontonagon county. Other counties whose sickness-rates were much *below* the average for the State, were: Iron, 1.87; Delta, 2.00; Baraga, 2.21, and Cheboygan, 2.80 cases per 10,000 of population.

Death-rates from reported Consumption in 1895.

The tier of counties having the greatest death-rate was the second, with 10.05 deaths per 10,000 of population.

By counties, the greatest reported death-rate from this disease during the year, 19 deaths per 10,000 of population, was in Crawford county. Other counties where the death-rates were much *above* the average death-rate for the State, were: Branch, 14.96; Alger, 14.06; St. Joseph, 13.59; and Wayne, 13.44 per 10,000 of population. The lowest death-rate (where death occurred), 1.01 deaths per 10,000 of population, was in Leelanaw county. Other counties where the death-rates were far *below* the average death-rate for the State, were: Ontonagon, 1.31; Delta, 1.48; Iron, 1.87, and Houghton, 1.94 deaths per 10,000 of population.

From the following three counties: Montmorency, Otsego, and Roscommon,—having an aggregate population of 9,164, no consumption was reported during the year.

The proportionate fatality from consumption in 1895, *i. e.*, the proportion of reported cases which proved fatal, was, for the whole State, 78 per cent, or more than 3 deaths to every 4 cases reported. From the following twelve counties: Arenac, Baraga, Clare, Gogebic, Iron, Keewenaw, Luce, Mason, Missaukee, Ogemaw, Ontonagon, and Oscoda, only the fatal cases were reported. In Wayne county the fatal cases were 97.1 per cent of all reported cases, and in Kent county 95 per cent. The minimum fatality (32.1 per cent of reported cases) occurred in Houghton county; and in Leelanaw county the fatality was 33 per cent of reported cases.

The map which follows table 4, shows for each county of the State the reported sickness and death-rates per 10,000 inhabitants, and the number of localities where the disease was present during the year.

PREVALENCE OF CONSUMPTION BY YEAR AND MONTHS.

Table 5 gives the number of cases of consumption reported as having taken sick in each month of the years mentioned. The onset in this disease is so insidious that definite statements as to the time when cases were taken sick can hardly be made.

In 1893 the State Board of Health classed consumption among communicable diseases dangerous to the public health. This act of the Board made it incumbent on health officers, in accordance with the health laws of the State, to report every case of consumption which to their knowledge occurred within their jurisdiction. In obedience to this requirement 4,128 cases of consumption were reported to this Office during the years 1894 and 1895. Of these 4,128 reported cases the health officers gave the dates of commencement of 879. Table 5 is an analysis of the said reports showing the dates, by year and months, when these 879 cases were taken sick. By this table (5) it is shown that some cases whose sickness was reported for the first time to this Office in 1894 and 1895, were taken sick as far back as 1890.

TABLE 5.—*Exhibiting the Number and Per Cent of Cases of Consumption reported to have taken sick, in each Month during the Years 1890-95. (Compiled from such Reports to the State Board of Health, in 1894-95, as stated the time when taken sick.)*

Year.	Total Number.	Number taken sick in each month.											
		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1890	2			1								1	
1891	8	1		2	3		1		1				
1892	19	1			2	5	4	2	1	3			1
1893	106	8	5	10	8	10	6	7	10	8	12	9	13
1894	422	53	19	35	28	26	36	38	54	34	32	29	38
1895	322	47	37	52	41	30	23	24	21	12	14	12	9
Totals	879	110	61	100	82	71	70	71	87	57	58	51	61
Percentages	100	12.5	6.9	11.4	9.3	8.1	8.0	8.1	9.9	6.5	6.6	5.8	6.9

TABLE 6.—*Exhibiting, by Months, the number of deaths from Consumption that were reported to have occurred in Michigan in 1894-95. (Compiled from such reports to the State Board of Health, as stated the time of death.)*

Year.	Total Number.	Number of deaths for each month.											
		Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
1894	453	32	28	33	41	45	40	36	33	35	37	41	52
1895	513	42	41	45	39	43	34	33	44	40	38	55	59

SOURCE OF CONTAGIUM OF CONSUMPTION.

Of the 2,068 cases of consumption reported, during the year 1895, as exhibited in Table 7, the local health officers reported the source of contagium as follows: Traced to a former case, 19; reported as inherited, 79;

attributed to "taking cold" or "exposure," 73; attributed to "La Grippe," 26; attributed to contagium from outside of jurisdiction, 12; unknown or indefinitely reported, 411; source not reported, 1,448; total, 2,068.

TABLE 7.—*Reported Source of Contagium of Consumption in 1895.*

Source.	Numbers of cases.
Cases reported as traced to a former case	19
Cases reported as inherited	79
Cases attributed to "taking cold" or "exposure"	73
Cases attributed to "La Grippe"	26
Cases attributed to contagium from outside of jurisdiction	12
Cases, the sources of contagium of which were reported as unknown, or the statements were too indefinite for classification	411
Cases, the sources of contagium of which were not reported	1,448
All cases	2,068

HOW CONSUMPTION IS SPREAD.

The tubercle bacillus, the specific cause of consumption, is found in the sputa of persons suffering from that disease whenever there is a disintegration of lung tissue. The dried sputum still contains the bacillus in a passive state. The dust of dried tubercular sputum when inhaled by susceptible persons is thought to be the most common way of transmitting pulmonary consumption from person to person. Members of a family, in which there is a consumptive, are constantly exposed to the danger of infection unless the sputa are collected and destroyed. The object of much work done by the State Board of Health is to educate the people in this simple means for restricting the spread of consumption.

On following pages is given correspondence between local health officers and this Office bearing on the subject of consumption:—

Consumption Contracted by Nursing Persons who had the Disease.

F. L. Hoffman, health officer of LeRoy township, Calhoun county, wrote to the Secretary of the State Board of Health, Dec. 8, 1895, as follows:—

"Mrs. Celia Farr came into my hands with a diagnosis of consumption and from the existing symptoms I should say that the diagnosis is correct. She is 36 years old and has suffered from the trouble two years.

"The source of contagion was contact with cases which she nursed."

A Postmaster has Consumption. Members of his Family Died of the Same Disease.

The following letter from a citizen of a village in Montcalm county, was received by the Secretary of this Board, Nov. 8, 1895, mentioning the probable communication of consumption, and the dangerous location of a living consumptive as postmaster:—

"Late in the year 1893, one A. P——, of this place was taken with consumption and after a lingering illness died of this disease in the spring of '94. A companion of his W. T——, was with him and looked after him more or less during the last few weeks of his illness at D——.

"In a few months after P—'s death T—— began to complain of feeling poorly, and shortly after the doctors decided that his lungs were affected. Then his brother C. T——, was taken of the same trouble. During July of this year both these young men died.

"The father of these boys is postmaster here, and the boys both worked in the office under him. Now it appears that the father J. T—— is stricken with the same malady, and the remaining child, a girl of 12 years, also. Common report also has it that Mrs. T——, wife of the postmaster, and mother of the three children, heretofore mentioned, is also sick of consumption. Apparently all these cases can be traced to the P—— case clearly enough.

"Now if consumption is contagious this entire community is being daily exposed, for the postmaster still attends to the duties of his office, and people going to the office for and with mail are endangered.

"It occurs to me that vigorous methods should be adopted here and at once. While I am not qualified to speak authoritatively in relation to this matter, an investigation will show you the correctness of my statements, and the danger which threatens people who are compelled to visit the post office.

"I do not think the board of health of this place are qualified to handle this matter properly even if the law gives them full control. Believing this matter should be investigated by you and that the people of this village should be protected as far as is possible from contact with these unfortunate people."

November 12, 1895, the Secretary of this Board wrote, in answer to the above-quoted letter, as follows:—

"Immediately on receipt of your letter I commenced correspondence with the health officer, giving him full instructions just how to act. The subject of the restriction of that disease is entirely in the hands of the local health authorities. This Board has no appropriation which could be utilized at present to send an expert there to investigate, and I would prefer not to send any one until I have heard from the health authorities. It is the duty of the health officer to act, and if he does not, I shall be glad to be informed.

"I have had your letter hektographed, with some comments by me, and will endeavor to place the copies where they will do the most good. I send you a copy herewith.

"In due time I hope to hear from you again regarding this outbreak of consumption, to know whether anything has been done for its restriction, and whether there have been any new cases likely to have come from the same source."

November 9, a "blue letter" was sent to the health officer of the township of R——, who on November 12, 1895, wrote to the Secretary of this Board, as follows:—

"Your communication received regarding consumption in family of Postmaster in this place. The case has not been reported to me as such. However, two of the P. M.'s sons died of consumption July last, and same was as I understand reported to State Board of Health through S——, of E—— H——. I enquired of attending physician and he said P M. had fever. If consumption is reported to me I shall act accordingly. The people here have circulars, etc., treatises on prevention of communicable diseases will also be distributed.

"Care was taken when the sons died to prevent the spread of the disease."

The Secretary of this Board answered the above-quoted letter, Nov. 13, as follows:—

"Your letter of November 12, relative to consumption, is before me for which please accept thanks.

"Relative to Drs. —— reporting the cases, they did not report them, and furthermore they were not obliged to report them to this Office as the cases were not in either of their jurisdictions.

"You say 'I enquired of attending physician, and he said P. M. had fever. If consumption is reported to me I shall act accordingly.' I trust that in this instance, and whenever you receive notice from this Office that there is within your jurisdiction a disease dangerous to the public health, that you will consider it 'good reason to believe that there is within the township' of which you are health officer, such a disease, and that you will 'immediately investigate' as required by Act 137, laws of 1883. The law does not contemplate your waiting for a technical 'report' before you act for the safety of your people.

"It is alleged that the boys both worked in the postoffice under their father; that the father is now stricken with consumption; that his remaining child, a girl of twelve years, is also stricken with the same disease, and it is also commonly reported that the wife of the postmaster, and mother of the three children before mentioned, is also sick with consumption.

"I trust that you will consider this last paragraph 'good reason to believe' that there is within your jurisdiction a disease dangerous to the public health, and that you will take action to investigate and if necessary prevent the further spread of the disease."

Will Cases of Consumption be Reported, or will False Reports be Made?

Jas. H. Travis, M. D., health officer of Elsie village, Clinton county, wrote to the Secretary of the State Board of Health, March 12, 1896, relative to reporting cases of consumption, as follows:—

"Dear Sir:—Yours dated March 10, 1896, relative to a case of consumption for which you asked a report May 15, 1895, received.

"The case was without authority reported by me. The physician in attendance said it was not consumption, but I considered it as such and so reported it. Perhaps I did wrong in reporting the case; the patient died.

"I think if your object in having cases reported is to place restrictions on and have them isolated and treated as unclean beings, you will find that the [reported] number of cases will diminish in Michigan, and the credit given to isolation and disinfection of sputa, etc., when in reality it will be that the cases will be called anything but consumption."

Thus far the reported cases are increasing in number; but, whatever is done about reporting the *cases* to the State Board of Health, the reports of *deaths* to the Secretary of State should show whether or not the morality from consumption is decreasing, unless false or incorrect statements are made as to the causes of death, and it is not probable that the honorable medical profession will be guilty of any falsehoods.

Demand for literature on the subject of restricting Consumption.

August 1, 1895, H. M. Warren, M. D., health officer of Fayette township, Hillsdale county, wrote to the Secretary of this Board as follows, relative to a case of consumption in his jurisdiction which was likely to transmit the disease to others:—

"In reply to yours of 29th will say that Mrs. J. R—l came into the township of Fayette one month ago in an advanced stage of tuberculosis, and as she was allowing a little child to sleep with her, and no instructions of a precautionary nature having been given her, I wish some copies of the pamphlet to distribute among her friends for their guidance."

C. F. Barker, M. D., a practicing physician of the city of Manistee, wrote to the Secretary of this Board, Jan. 15, 1894, asking for literature on the subject of the restriction of consumption, which was sent to him; his letter was as follows:—

"I notice in one of my medical journals that you have issued, or are about to issue a pamphlet for the State Board of Health, relative to the restriction of the spread of consumption. I have long wanted such literature in a comprehensive form to place among families afflicted with tuberculosis. Will you kindly tell me whether you have these pamplets for distribution and send me a sample copy and the price of them by the dozen, so that I can order more of them, and oblige."

Should Consumptives be Isolated? Will indigent consumptives be township or county charges?

R. S. Trask, M. D., health officer of Kalkaska township, Kalkaska county, wrote to the Secretary of the State Board of Health, asking what should be done in the restriction of consumption among paupers, and whether they should be township or county charges; his letter read as follows:—

"Please inform me by return mail, 1st—Is it necessary for the protection of the public health to quarantine a case of consumption the same as small-pox, scarlet fever and other contagious diseases? 2d—When consumption is known to be in a family of township paupers, where the township takes care of its own poor, could the county be held responsible for their support and medical treatment the same as in an outbreak of small-pox, scarlet fever, etc. Please answer at once."

The Secretary of this Board wrote, May 29, 1895, in answer to the above-quoted letter from Dr. Trask, as follows:—

"Replying to your first question relative to the isolation or quarantine of consumption, in the resolution adoption by this Board the question of the isolation of the patient is not mentioned, the purpose of the resolution is stated in a foot-note on a slip, which I have marked and enclosed herewith.*

"Replying to your second question as to whether the county is liable for the support and medical treatment of a consumptive patient, the same as in other diseases dangerous to the public health, Section 1647 of Howell's statutes provides, that the Board of Health shall make effectual provision in the way of providing nurses and other assistance and necessaries, which shall be at the charge of the person, if able, if not able, then at the charge of the county to which he belongs, this would apply to persons sick with consumption, as well as any other disease dangerous to the public health.

"By this mail I send you some publications bearing upon the restriction and prevention of consumption."

Should Indigent Consumptives be sent to the County House? The need for a Consumption Hospital.

John Hevener, Supt. of Poor, of Lapeer county, wrote to the Secretary of the State Board of Health, Aug. 22, 1895, relative to sending a person who has consumption, to the county poor-house. Mr. Hevener's letter was as follows:—

"Is a person that has consumption a proper person to take to the County House? I have a case on hand and thinking your Board has decided consumption contagious, it was a question about admitting such persons to County House. Will you please give me your opinion?"

Aug. 23, 1895, the Secretary of this Board answered the above-quoted letter from Mr. Hevener, as follows:—

"Your letter of August 22, relative to 'Is a person who has consumption a proper person to take to the county house?' is before me. Undoubtedly a consumptive person is a source of great danger to associates unless the consumptive knows how to restrict the disease, and is conscientious and careful to do what is necessary. The State Board of Health had this danger in mind when it prepared the bill introduced at the last session of the Legislature providing for a State Consumptive Hospital, where all such persons could be sent. The bill did not meet with any favor with the last Legislature, so it remains for Superintendents of the Poor to do the best they can with that class of persons.

"By this mail I send you a number of pamphlets and leaflets relative to the restriction and prevention of consumption.

"Will you kindly inform me the name of the person who is sick with consumption and also where he or she lives?"

---

*"Its purpose is to secure to the local health authorities and to the State Board of Health information of the location of each case of this most dangerous disease, with the view of placing in the hands of the patient, reliable information how to avoid reinfecting himself or herself, or giving the disease to others, and in the hands of those most endangered, information how to avoid contracting this disease."

In reply to questions asked in the above-quoted letter from this Office, Mr. Hevener wrote, Aug. 23, as follows:—

> "Yours of the 23rd received. The woman's name is Mrs. B—e and she lives at Columbiaville, Lapeer county, Mich."

Mr. Hevener called at the Office of the State Board of Health, Nov. 14, 1895, and said the woman spoken of above was taken to the county house and was still living there, but her daughter had died of tubercular disease, although at first her sickness appeared to be typhoid fever, followed by hip-joint disease and death.

A "blue letter" relative to consumption was sent to C. A. Wisner, M. D., health officer of Columbiaville township, giving him notice of the case of consumption in his jurisdiction.

A neglected case of Consumption in Middle Branch township, Osceola county.

C. M. Dunham, health officer of Middle Branch township, Osceola county, wrote to the Secretary of the State Board of Health relative to a case of consumption that was living under very unsanitary conditions and where persons and animals were exposed to the contagium. Mr. Dunham's letter was as follows:—

> "The case of consumption came to the place where he is now stopping about a month ago. Was reported to me April 17, as being a case of consumption. By investigating I find it to be a very inconvenient place for the patient, also dangerous for the family. The surroundings are very bad for them both; could not be worse. On the west side of the rooms that they are in is a large hen-house containing over 100 fowls, and on the east side about 20 feet from the house is a pig-pen and cow-stable; about 50 feet to the south east is a large barn yard occupied by about 15 head of cattle. The slops are all thrown at the back door next to the pig-pen. The sick man has no relatives here, and has plenty of property to take care of himself with, but is very miserly. Some of the people of this place wish him sent to the hospital at Big Rapids. Please inform me how to proceed to have him removed. Please send me all necessary information, and more blanks like one enclosed."

The Secretary of this Board answered the above-quoted letter, April 23, 1895, as follows:—

> "I note what you say about the surroundings of the patient and that they could not be worse and asking how to proceed to have the patient removed.
>
> "When notice or information of the occurrence of a case of communicable disease reaches the local board of health, the board should act promptly for the restriction of the disease, and I think that Section 1647 of Howell's Statutes would apply in your case and I herewith enclose a marked copy of a pamphlet bearing upon that subject."

Consumption in Harbor Springs village, Emmet county.

R. Emmet Flood, M. D., health officer of the village of Harbor Springs, wrote to the Secretary of this board, March 11, 1896, giving his ideas relative to the communicability of consumption, as follows:—

> "The case of consumption which I reported some time last spring, died during the summer, in July, I think. She was one of a large family, all ignorant, dirty, scrawny people, certainly the best possible subjects for contracting a communicable disease. I do not think that any precautions were taken to prevent their contracting it, yet not one of them has done so.
>
> "Every practicing physician has seen many such cases while I think few if any have seen a case of a person without the hereditary predisposition, contract consumption from living in the same house with one suffering from it.

"We have no consumption in Harbor Springs at present and I think if we never do have until it is communicated to some one from a consumptive patient, we will all die of some other cause. I would also humbly state with all due respect to the State Board of Health, that I firmly believe that the shade of Hippocrates tears the feathers out of his wings, and drapes his harp in mourning every time a State Board of Health recognizes consumption as a communicable disease."

Consumption in the city of Niles.

F. R. Belknap, M. D., of Niles, in a letter to the Secretary of the State Board of Health, dated Feb. 3, 1895, stated as follows relative to instances of consumption under his observation:—

"We have little or no scarlet fever, diphtheria, etc., but there has been considerable consumption. It seems to me the step which it is now incumbent upon the State Board to take is in regard to consumption. I believe its ravages can be greatly checked by appropriate measures. Personally I do not think the hospital plan is feasible, but some efficient and well-carried-out plan of household disinfection in all cases of lung trouble is the most reasonable and possible plan.

"I have in mind two healthy families in which cases of consumption occurred and as a result two or three other cases followed the first outbreak. This occurred this year, and it is a *very frequent* occurrence here. Isolation would have prevented them, but the combined forces of ignorance, unprincipled practitioners of medicine of which this State probably has more than most any other, and the absence of set rules of the State Board for the guidance of the local physician are now too much for us to overcome."

"P. S.—Do not infer from the above that I think the State Board has no such rules for preventing consumption, but thus far I question their satisfactory efficacy."

In answer to the above-quoted letter from Dr. Belknap, the Secretary of this Board wrote Feb. 7, as follows:—

"Relative to consumption, pamphlets bearing upon the restriction and prevention of consumption were sent to the health officer of Niles a few days ago. I would send some to you if you would use them. They are for distribution to those interested in the subject."

A request for reports of cases of consumption was made of J. D. Greenamyer, M. D., health officer of Niles. In response to this request Dr. Greenamyer wrote to the Secretary of this Board March 22, as follows:—

"I have before me your demand for special reports relative to consumption, and in reply wish to say that I will comply with this demand if you so insist, but it will of necessity be along strictly legal lines, that is of cases legally and regularly reported to this office by physicians and householders. In this way only can I make such report to your Office. In my weekly reports hitherto I have estimated the prevalence of consumption in the same manner as any other disease, relying upon my own judgment and knowledge as it comes to me; to make reports on the blank 'M' will necessitate a trimming down of my weekly reports accordingly, for with the meagre pittance of $20.00 per year as health officer of this city it will be impossible for me to do any more. When physicians and householders can be compelled to make regular reports to the local health officer will it be possible to carry out this provision of law. From the very nature of the disease, but few of the cases are regular patients of any physicians; patent nostrums, charms, donothing, etc., are usually in charge of the patient where the disease is established. It would seem in order to make this law operative some other provisions are necessary. As the spring election is close at hand the local board of health will no doubt be changed, and possibly the health officer, but until then I will do the best I can under the circumstances, but hereafter I shall not report any cases of consumption, unless they are regularly reported to me. Pardon these few lines on this all important matter."

March 23, the Secretary of this Board answered the above-quoted letter from Dr. Greenamyer, as follows:—

"Your letter of March 22, relative to consumption is before me, for which please accept thanks.

"Relative to physicians and householders making reports, I herewith enclose a marked pamphlet bearing upon that subject.

"I also note what you say about not reporting any cases of consumption unless they are regularly reported to you. You should also include all cases under your own observation."

Measures employed to restrict consumption in Norton township, Muskegon county.

Publications relative to the restriction of consumption were sent to J. F. Maxfield, of Norton township, Muskegon county. March 24, 1895, Mr. Maxfield wrote to the Secretary of this Board, as follows, relative to measures for restriction which were being taken in a case of consumption in his neighborhood:—

"Your cautionary papers against the spread of consumption came duly to hand and I went immediately to the home of the consumptive patient and gave them to her. Also distributed some of them among their nearest neighbors. The case is in the person of M—— K——, who is herself a practical nurse, having attended a reputable institution in Chicago for teaching the same. She has from the first taken great cautionary measures to prevent its spread to other members of the family.

"Her sputum she receives in cloth which she immediately burns. * * *

"She is in the last stages of the disease and in all probability will last only a few weeks longer. It is to be lamented that she must go, for the world can ill afford to lose the like of this saintly woman. * * * "

Alleged Tuberculosis among Deer and Rabbits in Michigan.

Sylvester France, Supervisor of Prairieville township, Barry county, in a letter to the Secretary of this Board, Dec. 30, 1895, stated substantially as follows relative to tuberculosis among deer and rabbits in Michigan:—

"I have a friend who once lived at Kalkaska, who was complaining of the climate, saying that the young people were dying with consumption; and stated that a hunter had told him that he had never killed a deer or rabbit whose lungs were sound. Has the attention of the State Board of Health ever been called to the fact of tuberculosis being prevalent among the wild game of this State?"

AGES OF GREATEST PREVALENCE OF, AND MORTALITY FROM, CONSUMPTION.*

In Table 8 are shown the numbers of cases and deaths from Consumption in Michigan in 1895, in which the ages were stated in the health officers' reports. In this table the cases and deaths are arranged in *age groups*, showing what per cent the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths; the per cent the deaths in each group were of the cases in that group, and the per cent the deaths in special groups were of all deaths.

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*In compiling data relative to ages, used in tables in this article each age-period begins and ends on the birthday. For arranging the ages by single years or in age-periods the following method is pursued:—From birth to one year old is the *first* year. Those one year old and less than two years old are classed in the second year. The third year of age includes all persons over two years and less than three years of age, and so on for each succeeding year.

In dividing the ages into five-year periods, the first period includes all ages from birth to five years, or all *under* five years of age. The second five-year period includes all ages of five years and over and less than ten years. In each succeeding period the same arrangement is followed.

TABLE 8.—*Exhibiting in certain Age-groups, the number of cases and the number of deaths from Consumption; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of all deaths; and the per cent that the deaths in each group were of the cases in that group.—Compiled from all reports for the year 1895 which stated the ages.*

	Number and per cent of Cases and Deaths in certain Age-groups.*															
Ages in groups of years.	All known ages.	Under 10 Years.	10 to 14.	15 to 19.	20 to 24.	25 to 29.	30 to 34.	35 to 39.	40 to 44.	45 to 49.	50 to 54.	55 to 59.	60 to 64.	65 to 69.	70 to 74.	75 years and over.
No. of cases	†379	8	12	36	65	56	52	46	28	22	12	11	9	10	5	7
Per cent the cases in each group were of all cases of known ages	100	2.1	3.2	9.5	17.2	14.8	13.7	12.1	7.4	5.8	3.2	2.9	2.4	2.6	1.3	1.8
No. of deaths	†286	8	9	30	51	34	40	31	20	17	10	9	6	10	4	7
Per cent the deaths in each group were of cases in that group	75.5	100	75	83.3	78.5	60.7	76.9	67.4	71.4	77.3	83.3	81.8	66.6	100	80	100
Per cent the deaths in each group were of all deaths at known ages.	100	2.8	3.1	10.5	17.8	11.9	14.0	10.9	7.0	5.9	3.5	3.1	2.1	3.5	1.4	2.4
Per cent the deaths in special groups were of all deaths at known ages	....	5.9		40.2			31.8			22.0						

* Method of grouping is stated in foot-note to the sub-head under which this table appears.

† Does not include those cases or deaths where the age was not stated.

TABLE 9.—*Exhibiting, by Sex, the Ages of 541 persons who died of Consumption, during the years 1894-5.* (*Compiled from such reports to the State Board of Health, as stated Sex and Age.**)

Year.	1894.			1895.		
Age at Death.	Males.	Females.	Totals.	Males.	Females.	Totals.
10 years and under	5	2	7	1	7	8
10 to 20 years	14	39	53	13	26	39
20 to 30 "	33	44	77	29	56	85
30 to 40 "	20	31	51	27	44	71
40 to 50 "	13	12	25	13	24	37
50 to 60 "	8	6	14	9	10	19
60 to 70 "	6	14	20	7	9	16
70 to 80 "	3	3	6	3	7	10
Over 80 "	2	0	2	1	0	1
	104	151	255	103	183	286

* The method of grouping ages for 1894 was slightly different from that employed for 1895, but as the difference would affect principally the first age-period (which included all ages from birth to five years and six months of age) and the occurrence of consumption at this age is not great, the material for 1894 will be placed in the tables under the new grouping of ages for 1895. (See foot-note page 347).

TABLE 10.—*Exhibiting, by Sex and in certain Age-groups, the per cent of persons who died from Consumption in Michigan, during the years, 1894–5; also the average age at death, and the number of deaths included. (Compiled from such reports as stated the ages.)*

Deaths from Consumption.													
Year.	Sex.	Average age, Years.	No. of Deaths included.	Ages.—In Periods of Years. Per Cent of Deaths in each Period of Age.*									
				All ages.	Under ten Years.	10 to 19.	20 to 29.	30 to 39.	40 to 49.	50 to 59.	60 to 69.	70 to 79.	Over 80 years.
1894.	Males	34.7	104	100	5	13	32	19	13	8	6	3	2
	Females	32.7	151	100	1	26	29	21	8	4	9	2	0
1895.	Males	36.2	103	100	1	9	30	27	13	10	7	3	1
	Females	33.4	183	100	4	10	34	24	13	6	4	5	0

* Methods of grouping are explained in foot-note on page 347, and in the foot-note to Table 9.

From Tables 9 and 10, it may be seen that there were 127 more deaths reported from consumption among females than among males (where age and sex were stated in the reports), during the years 1894–95.

Table 10 shows that the highest per cent of deaths, for each sex, occurred in the age period from 20 to 29 years. The average age at death was 2.8 years more for males than for females in 1895.

DURATION OF CONSUMPTION.—FATAL AND NON-FATAL CASES.

Fatal Cases.

TABLE 11.—*Exhibiting by Sex of Patient, the duration in months and years of fatal cases of sickness from Consumption, in Michigan, during the years 1894–95, Arranged in time-periods. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of Consumption.																				
Year.	Sex.	No. of cases included.	Duration of sickness:—Per cent of Deaths in each Period.																	
			All cases.	1 Month.	2 Months.	3 Months.	4 Months.	5 Months.	6 Months.	7 Months.	8 Months.	9 Months.	10 Months.	11 Months.	Under one Year.	1 to 2 Yrs.	2 to 3 Yrs.	3 to 4 Yrs.	4 to 5 Yrs.	Five Years and over.
1894.	Males	44	100	9.1	9.1	2.3	4.5	9.1	4.5	2.3	11.4	9.1	6.8	0	68.2	20.5	6.8	0	2.3	2.3
	Females	88	100	4.5	5.7	11.4	4.5	8.0	6.8	6.8	2.3	9.1	1.1	6.8	67.0	19.3	3.4	8.0	1.1	1.1
1895.	Males	43	100	9.3	2.3	2.3	9.3	9.3	10.6	4.7	7.0	2.3	2.3	0	60.5	16.3	9.3	9.3	0	4.7
	Females	99	100	2.0	7.1	8.1	7.1	4.0	9.1	6.1	6.1	4.0	4.0	3.0	60.6	28.3	5.1	2.0	2.0	2.0

By Table 11, it may be seen that from reports received during the years 1894–95 which stated the interval between the time of being taken sick and the time of death from consumption, 60 to 68 per cent of the deaths occurred in the first year of sickness (varying with the year and sex); 16 to 28 per cent in the second (1 to 2) year of sickness, and 11 to 22 per cent died after being sick over two years. This does not show the correct duration of fatal cases of consumption. Probably many cases are not diagnosed and called consumption until the patient is confined to the house. Williams* gives the average duration of fatal cases as about 7 years, while the average duration of the fatal cases in Table 11 was, for males 16.5 months, and for females 13 months.

Non-Fatal Cases.

TABLE 12.—*Exhibiting by Sex of Patient, the Duration in months and years, of Non-Fatal cases (still sick) of Consumption, in Michigan, in the years 1894–5; as stated in the reports to the State Board of Health.*

Non-Fatal cases of Consumption.																				
			Duration of Sickness:—Per cent of Cases in each Period.																	
Year reported.	Sex.	No. of cases included.	All periods.	1 Month.	2 Months.	3 Months.	4 Months.	5 Months.	6 Months.	7 Months.	8 Months.	9 Months.	10 Months.	11 Months.	Under 1 Yr.	1 to 2 years.	2 to 3 years.	3 to 4 years.	4 to 5 years.	10 to 12 Yrs.
1894.	Males	22	100	4.55	4.55	4.55	0	9.09	4.55	4.55	4 55	4.55	0	4.55	45.45	31.82	9.09	9.09	0	*4.55
	Females	14	100	7.14	21.43	0	0	7.14	0	0	21.43	0	0	7.14	64.29	28.57	0	0	†7.14	0
1895.	Males	20	100	10.0	0	0	20.0	5.0	0	0	10.0	5.0	10.0	5.0	65.0	15.0	15.0	5.0	0	0
	Females	30	100	6.7	10.0	6.7	6.7	0	6.7	3.3	13.3	6.7	10.0	6.7	76.7	16.7	6.7	0	0	0

* One case was reported as having been sick from 10 to 12 years.
† One case was reported as having been sick from 4 to 5 years.

In Table 12 it may be seen that in non-fatal cases of consumption from 45 to 76 per cent (varying with the year and sex) were reported as having been sick less than one year, from 15 to 31 per cent had been sick from 1 to 2 years, and from 6 to 22 per cent had been sick over two years.

The average duration of sickness was: In males 13.2 months, in females 9.7 months.

CASES OF CONSUMPTION REPORTED AS HAVING RECOVERED.

In the reports relative to consumption received at this Office during the years 1894–5, seventeen cases were said to have recovered from the disease; eleven of these cases were reported in 1894 and six in 1895; they are tabulated below according to sex, age and duration:—

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* Williams, "Pulmonary Consumption," page 325.

Sex.	Age.	Duration.	Sex.	Age.	Duration.
Males	14 years.	Not stated.	Females	21 years.	2 years and 8 mo.
	18 years.	7 months.		19 years.	5 months.
	27 years.	4 months.		35 years.	3 months.
	Not stated.	3 years and 10 mo.		Not stated.	1 year.
	41 years.	Not stated.		37 years.	2 months.
	19 years.	7 months.		20 years.	Not stated.
	27 years.	8 months.			

Sex, age and duration not stated in four of the cases reported as having recovered.

The average age of the six male cases, where the ages were stated was 24.3 years; of the five female cases, 26.4 years.

The average duration of sickness was for males, 14.4 months; for females 10.8 months.

INFORMATION CONTAINED IN FINAL REPORTS OF CASES OF CONSUMPTION IN 1895.

Forty-two final reports relative to fatal cases of consumption in Michigan in 1895, contained information which may be summarized as follows:—

Location of the disease, stated as in the—

Lungs in	25	instances.
Lungs and bowels in	2	"
Throat and lungs in	1	"
Bowels in	3	"
Liver and bowels	1	"
Mesenteric glands	1	"

Occupation mentioned in 35 instances, as follows:

Housekeeper in	18	instances.
School girl in	2	"
Printer in	1	"
Nurse in	1	"
Servant in	2	"
Farmer in	4	"

"Cutter," "Student," "R. R. Man," "Farmer's wife," "Cook," "Clerk," "Foreman," each 1 instance.

Consumptive relatives mentioned in 19 cases, as follows:

Mother in	3	instances.
Mother and sister in	3	"
Father in	3	"
Brother in	1	"
Sister in	2	"
2 Sisters and Husband in	1	"
2 Sisters and Brother in	1	"
Uncle in	1	"
Aunts in	1	"
Grandmother in	1	"
Daughter in	2	"

Consumptive associates were mentioned in 11 instances.

The disease was said to have been communicated (from sister) in one instance.

The disease was not reported as having been communicated to animals in any instance.

Disinfection of Sputum and other restrictive measures, were mentioned in 20 instances. Sputum was said to have been destroyed in most cases where mentioned by burning the cloths in which it was collected. In ten instances disinfection was said to have been neglected.

PREVALENCE OF DISEASES OF THE CHEST IN DETROIT AND NEW ORLEANS.

The following is a copy of a hektograph letter sent out from this Office about the middle of October, 1895, showing the death-rates from diseases of the chest in the cities of New Orleans and Detroit, for the month of August 1895:—

MICHIGAN A HEALTHFUL STATE.

Deaths From Lung Diseases not so Great in Detroit as in New Orleans.

The Secretary of the State Board of Health received a letter from a gentleman in Saginaw who stated that a relative now residing in Glasgow, Scotland, wished to come to this country, on account of her having had pleurisy, had been "advised by her physician in Glasgow, on no account to go to live in the State of Michigan" The Saginaw gentleman wishes to know how Michigan compares with other States with regard to sickness and deaths from lung troubles. Secretary Baker's reply included the following:—

"Replying to your letter of Oct. 14, diseases of the lungs and air-passages are cold weather diseases, and in Michigan, where we have an excellent system of sickness statistics, there is no difficulty in proving this; pleurisy, influenza, tonsillitis, bronchitis and pneumonia follow very closely the changes in temperature, rising after the temperature falls, and falling after the temperature rises; the same is true of consumption except that the longer period of incubation apparently causes the disease to reach its maximum a considerable time after the coldest weather; its minimum is reached only about a month after the highest temperature.

"It has been assumed that the same principle should govern the prevalence of diseases of the lungs and air-passages in cold and warm *climates* as in cold and warm *seasons of the year* in any given climate. But, so far as I know, this is not established; it does not seem to be true. And, in this country at least, the mortality from these diseases seems to be greater in the Southern States than it is in the Northern States. I have not at hand at this moment convenient statistics to demonstrate this; but I have taken the trouble to ascertain the death-rates in New Orleans and in Detroit in the month of August, 1895, from bronchitis, pneumonia, and phthisis pulmonalis. Taking the official reports of the health officers of those two cities, and using the population which they report, namely 250,000 for Detroit, and 275,000 for New Orleans, the number of deaths per 100,000 inhabitants is as follows:—

	Bronchitis.	Pneumonia.	Phthisis Pulmonalis.
Detroit	2	2	14
New Orleans	3.6	5	24

"My belief is that Michigan is one of the most healthful States, in this country and in the world. I believe that the temperature is rendered milder in winter and cooler in summer through the influence of the great lakes which nearly surround the State. I believe the mortality from lung diseases is on this account less than in other States and countries in the same latitude.

"False ideas have been gained from statistical charts which have shown the ratio of mortality from lung diseases to the mortality from all causes, some of which charts have made it appear that there is a large mortality from lung diseases in the Northern States; but such charts are misleading, because the mortality from all causes is so much larger in the Southern than in the Northern States.

"Many people with sensitive lungs have *seemed* to derive benefit from a residence in a warmer and drier climate than Michigan during the winter months, but for a permanent residence I believe that Michigan is one of the best States in the Union." * * *

"By this mail I send you our leaflets on consumption, from which you will see that we consider it a dangerous communicable disease. That is another reason why Michigan is a comparatively safe State to live in, because *in this State* efforts are being made to restrict the tubercular diseases."

From Feb. 27, to Sept. 25, 1895, the form printed below was hektographed and used as a "blue letter" for consumption:—

STATE BOARD OF HEALTH, MICHIGAN,
OFFICE OF THE SECRETARY.
Lansing, ...*1895.*

....
Health Officer of......................................
....

DEAR SIR:—I am informed that consumption is present in your jurisdiction. Consumption is a "disease dangerous to the public health." By this mail I send you a few pamphlets and a few slips, telling how consumption may be restricted and prevented. I trust that you will distribute them to persons likely to be interested in the subject. I can send more if you can use them to good advantage.

Please make special weekly reports on blanks "M." which I send you, so long as the disease lasts. It is especially desirable that we have the weekly report for the week during which a case recovered or died.

Very respectfully,
HENRY B. BAKER, *Secretary.*

The use of the following "blue letter" was begun Sept. 26, 1895:—

[203] MICHIGAN STATE BOARD OF HEALTH.

OFFICE OF THE SECRETARY.

Lansing, Mich...................................*189*..

To..
Health Officer of..
....*Mich.:*

DEAR SIR:—I am informed that **Consumption** (tuberculosis) is present in your jurisdiction.

By this mail I send you......copies of the revised leaflet issued by this State Board of Health on the Restriction and Prevention of Consumption; also......copies of a slip "Instructions to Consumptives and their friends." I trust you will distribute these where they will do the most good; and it is believed that if distributed to the patient, to the occupants of the household, and *to the neighbors of the families in which the disease is present*, the leaflets will be most likely to be read with interest and profit.

DISINFECTION.—After a death from pulmonary consumption, or the removal of a well-developed case of this disease, disinfection of rooms and contents liable to be infected should be done by the health officer, as required by law (Act 137, laws of 1883), in all diseases "dangerous to the public health."

CONSUMPTION IS A "DISEASE DANGEROUS TO THE PUBLIC HEALTH."—It is communicable, and it causes the most deaths, so it is the most dangerous disease, therefore, according to the law, it must be reported. The State Board of Health has voted "That hereafter, consumption (and other diseases due to the bacillus tuberculosis), shall be included in the official list of 'diseases dangerous to the public health' referred to in sections 1675 and 1676 Howell's statutes, requiring notices by householders and physicians to the local health officer, as soon as such a disease is recognized." The purpose of this resolution is to secure to local health authorities and to the State Board of Health, information of the location of each case of this most dangerous disease, with a view of placing in the hands of the patient, reliable information how to avoid re-infecting himself or herself, or giving the disease to others; and in the hands of those most endangered, information how to avoid contracting the disease. Also to secure to the State Board of Health, through the reports of local health officers, such data and information as will enable it to publish, from time to time, for the benefit of the people, a revised natural history of the disease, and the best measures for its prevention.

REPORTS TO STATE BOARD OF HEALTH.—We are trying to collect all the facts we can in regard to this most important disease; we will, therefore, be grateful for any such fact which may come to your knowledge. I trust that you will make *special weekly* reports, on blanks [M.] which I send you by this mail, so long as the disease remains in your jurisdiction. These reports are asked for under State law, Sec. 8, Act 81, laws of 1873, being section 1629 Howell's Statutes. For the week during which a case died it is desirable that the report be especially prompt. It is desired to have a report of each apparent recovery. A blank for a *final* report will be sent to you later.

Very respectfully,
HENRY B. BAKER,
Secretary.

INVESTIGATION RELATIVE TO A CASE OF CONSUMPTION. (TUBERCULOSIS.)

(Questions to which answers will probably be asked in your final report, for which a blank will be sent to you later.)

1. Was this a case of well-developed tuberculosis of the lungs? What was the disease called by the attending physician? In what part of the body was the disease located?
2. In what township, village or city did the patient reside?
3. What was the probable origin of the disease?
4. Previous to being taken sick, what was the occupation of the patient?
5. When (how many months or years ago) was there a case of consumption on the premises where this patient resided?
6. Was all of the sputa from this patient disinfected before being permitted to dry?
7. What was done with the bowel discharges of the patient?
8. Was the clothing or bedding which was soiled by the sputa of the patient thoroughly disinfected?
9. Was the room which the patient occupied while sick, together with its contents, disinfected with burning sulphur? If so, how much sulphur was burned; How much was this per thousand cubic feet of air-space?
10. Was everything which was liable to be soiled by consumptive sputa destroyed by fire, or disinfected thoroughly? How?
11. What else was done to restrict the spread of the disease?
12. After the patient was taken sick, what exceptions were there to the complete accomplishment of the foregoing measures,—disinfection of sputa. etc.?
13. Can you trace this case of consumption to a former case?
14. Can you trace any other case of tuberculosis to this one?
15. If isolation was practiced, give a short statement of how it was enforced, or practiced?
16. Was the patient married or single; black or white; dark, auburn, light or sandy complexion; age; nationality, etc.
17. Was the sputa examined for the *Bacillus tuberculosis?* If so, by whom, and with what result?

On pages lxiv and lxv of Part I of this Report is printed the blank form first used in October, 1895, for special final reports of cases of consumption.

TUBERCULOSIS IN CATTLE.

During the year 1895, communications were received at this Office stating the presence of tuberculosis in animals in three localities in Michigan, relative to which the following extracts from the correspondence of this Office give details:—

TUBERCULOSIS IN CATTLE AT THE STATE PUBLIC SCHOOL AT COLDWATER.

The "Detroit Free Press" of April 30, 1895, contained the following paragraph:—

"Coldwater, Mich., April 29.—(Special.)—The beef from the State school which was sent to Toledo for inspection and condemned, led the authorities to make a thorough investigation of the herd at the school to see if it was affected with tuberculosis. The State veterinary, Grange and local veterinarians, accompanied by J. J. Woodman, of Paw Paw, and H. H. Hinds, of Stanton, members of the State Live Stock Commission, made the examination yesterday and to-day. The test was applied to the whole herd of twenty-six, of which twenty showed a reaction. Two of the affected were slaughtered this afternoon, and a further test will be applied to the six in the herd in three weeks."

May 1, copy of the following letter was sent to each member of this Board by the Secretary:—

"DEAR SIR:—Hon. H. H. Hinds. President of the State Live Stock Commission, called at this Office yesterday, and reported that there was considerable tuberculosis in the herd of cattle at the Coldwater State Public School. On April 29 Mr. Hinds, the State Veterinarian, and others tested the herd with tuberculin, and Mr. Hinds says that about three-fourths of the cattle showed tuberculosis. Two cows were slaughtered, and the *post mortem* showed undoubted tubercular lesions. On May 13, another test will be made, and probably about 18 head slaughtered. Mr. Hinds suggests the question whether or not the State Board of Health will be represented, and whether or not the State Board of Health would like to undertake some bacteriological examinations. This seems to supply an opportunity for gaining information which may be of use to the public health.

"1. Shall this Board be represented at the examination May 13?

"2. If so, which member or members will the Board select?

"3. Should not Dr. Vaughan be requested to represent the Board, and be asked to make such bacteriological and other examinations as he may deem for the interests of the public health, and report the results to this Board?

"I shall be glad to hear from you on the subject, as soon as practicable.

"Very respectfully,

"HENRY B. BAKER, *Secretary.*"

"P. S.—I think the above letter should be sent to each member of the Board and that Prof. Vaughan be requested to be present at the test, May 13. for the purpose of making examinations for the State Board of Health.

"FRANK WELLS, *President.*"

May 3, the Secretary wrote to Dr. Victor C. Vaughan as follows:—

"Regarding the examination of the herd at the State Public School at Coldwater, all but Dr. Grange have been heard from, and all vote that you should be requested to represent the Board, and be asked to make such bacteriological and other examinations as you may deem for the interests of the public health, and report the results to this Board.

"Later than my letter of May 1, I have heard that the examination will occur *May 14* (Tuesday) instead of May 13 as I stated in my letter to the members.

"Doctor Milner suggests that you make a thorough examination of the milk, the excretions, and the tissues, including the muscles, tissues of the lungs, bowels and udder."

May 25, the Secretary received the following report from Prof. Vaughan:—

"DEAR DOCTOR:—Doctor Novy and I went to Coldwater. I found that I would need some one to assist me in carrying the large number of sterilized jars necessary to contain the desired material, also some one to aid me in arranging the same at Coldwater. We saw three or four of the animals killed. All of these were tuberculous, and I have since learned that all the eighteen which reacted to tuberculin were killed and found to be tuberculous. Doctor Novy and I obtained a large quantity of material and have inoculated a number of animals with the same. It is altogether too early for us to ascertain the results. Finding the tubercle germ with the microscope proved to be a very difficult thing, so difficult indeed that we succeeded in obtaining it in only two samples. I shall be glad to make a complete report after sufficient time has elapsed to see whether or not the disease develops in the guinea pigs inoculated. Some of these were inoculated with matter which was plainly tuberculous and others with matter which was supposed to be free from the germ."

TUBERCULOSIS IN CATTLE IN GEORGETOWN TOWNSHIP, OTTAWA COUNTY.

April 22, 1895, W. Chas. Covey, V. S., health officer of Georgetown township, wrote to this Office as follows relative to tuberculosis in a heifer:—

"I was called yesterday to see a heifer which has been running down for a long time. I quickly diagnosed the case as tuberculosis. I slaughtered the animal and found kidneys, spleen, omentum lymphatics much diseased and the lungs literally rotten with tubercles. This animal has been running with the milch cow over 2 years. What is my duty in this matter? I have notified the State Veterinarian.

"Please inform me. My successor has not qualified and I fear he is not going to, hence I deem it my duty to notify you."

July 27, M. L. Weston, M. D., successor to Mr. Covey as health officer, reported to this Office, that up to the above date (July 27), 3 animals had been affected with the disease, that the animals had been isolated, precautionary measures taken, and that the cases had been reported to the State Live Stock Commission.

Copy of Mr. Covey's letter was sent to Hon. H. H. Hinds, President of the State Live Stock Commission, from this Office.

TUBERCULOSIS IN CATTLE NEAR BIRMINGHAM, OAKLAND COUNTY.

The "Detroit Evening News" of Aug. 19, 1895, contained the following paragraph:—

"Birmingham, Mich., Aug. 19.—Tuberculosis has been discovered in O. W. Shipman's fine herd of Jersey cattle, one mile west of this place, and 27 of them have been condemned by the State veterinary surgeon. They will be taken to Detroit this afternoon.

"The herd consists of 50 cattle, and the loss to Mr. Shipman will be in the neighborhood of $2,000. Other herds in this vicinity are to be examined."

The action of this Board in connection with this outbreak is explained in the proceedings of this Board at its meeting Jan. 10, 1896, printed in Part I of this Report.

MEAT AND MILK FROM DISEASED ANIMALS.

Oct. 14, 1895, A. T. Getchell, health officer of Mount Pleasant, wrote to the Secretary of this Board as follows:—

"I wish the State Board could get a law passed compelling every village and city to employ a man to inspect the meat and milk that is sold, same as they have in large cities, and make it a penalty for any one to cut and retail a quarter of meat without a seal of the inspector on It seems as though when there is so much disease in meat something should be done to prevent diseased meat from being sold."

In reply to Dr. Getchell's letter, the Secretary wrote Oct. 15, 1895, as follows:—

"Your letter of Oct. 14, with a newspaper clipping relative to the restriction of bovine tuberculosis in Mass., is before me, for which please accept thanks. I agree with you that it would be very nice to have in every village and city a meat and food inspector, and I think something to that effect was done by the Michigan legislature last winter when an appropriation was made for the use of the Dairy and Food Commissioner to be used for a State Analyst and Food Inspector. I would recommend that you correspond with the State Dairy and Food Commissioner on the subject of inspection in Mt. Pleasant. Hon. C. E. Storrs, of Lansing, is the commissioner.

"If you know of diseased meat being sold, it is your duty to make complaint to the prosecuting attorney under section 2241 Howell's Statutes which makes it illegal to 'knowingly sell milk, the product of a sick or diseased animal or animals,' etc.

"Regarding a law to compel every city and village to employ an inspector of meat and milk, section 8 of Act 246, laws of 1887, bears directly on this point and reads as follows:—'Sec. 8. Authority is hereby given the common council of any city, and the board of trustees or council of any village to appoint an inspector of milk in any such city or village, and to fix their compensation, and when appointed said inspectors shall perform all duties required of inspectors as provided herein, and such other powers and duties as may be conferred or imposed by the ordinances of said cities and villages.'

"Herewith I send you a copy of the latest compilation of 'Laws of Michigan relative to Inspection of Foods and adulterations thereof.' I hope the pamphlet may be of use to you."

The clipping referred to in the Secretary's letter, was from the "Boston Transcript" and read as follows:—

"Drs. Osgood and Lyman, of the State cattle commission, who have recently returned from the national convention of the United States Veterinarian Association in Des Moines, Ia., report that one of the principal matters discussed by that body was the use of tuberculin. The concensus of opinion was that all health officers should do all in their power to restrict tuberculosis in cows, and that the tuberculin test is the only safe and practical one establishing the existence or non-existence of the disease. Reliance upon physical examination for the existence of tuberculosis was generally condemned.

"Since the new law went into effect in Massachusetts last June, leaving the owner to say whether or not the tuberculin test shall be used on his cattle, and giving him full compensation for stock killed, the agents of the Massachusetts board have tested about 2,500 animals, of which more than 600 were killed, and in every case where the tuberculin test indicated disease, the post mortem confirmed its prevalence. Many of these cattle showed no physical signs of tuberculosis. The disease appears to be general over the State, and in some instances entire herds have been killed.—*Boston Transcript.*"

DISEASED MEAT SENT FROM COLDWATER TO TOLEDO.

April 9, 1895, C. O. Probst, M. D., Secretary of the State Board of Health of Ohio, wrote to the Secretary of this Board as follows:—

"I enclose herewith a copy of a letter received from the meat and food inspector of Toledo, Ohio. Our Attorney General advises that this constitutes an offense against the State of Michigan on the part of Mills & Miller, and that they should be dealt with by the authorities of your State. I have so informed Mr. Sacks.

"If any action is taken by your Board in this matter I should be pleased to know of it."

The letter from Mr. Sacks, referred to in Dr. Probst's letter, was as follows:—

"I have a case here which the School Board of the Homeless Children and Orphans School of Coldwater, Michigan, are the camplainers. They had a fat cow which they had slaughtered (for their own use) by Mills and Miller of Coldwater, Mich. Mills and Miller informed the board that the cow was diseased. At once the board secured two veterinary surgeons to inspect the meat and they found the lungs badly diseased and filled with pus, also found several tumors on the meat between the ribs also filled with pus, and they pronounced the meat unwholesome, and the board asked Mills and Miller whether they could not dispose of the meat by feeding it to Mills and Miller's hogs that were about the slaughter house and they said they would do so.

"A few days later Mills and Miller cut the tumors neatly from the beef and shipped the beef to Toledo, O., consigned to Armour & Co. and the school board was notified to that effect, and at once sent their Superintendent to Toledo and informed me of the facts. I at once looked after the case and found the meat at the Lake Shore freight depot in the car. At once I obtained an order from Armour & Co. and paid the freight and took the meat in my charge, and I also have it in my possession now. It is a very fine looking piece of meat, weighing between 700 and 800 pounds. The Supt. identified the meat as soon as he saw it. The places where Mills and Miller cut out the tumors can plainly be seen. This is a very peculiar case and I would like your advice at once."

April 13, 1895, in reply to Dr. Probst's letter the Secretary of this Board wrote:—

"Please accept thanks for your letter of April 9, and for the letter of April 6, from Casper Sacks, Meat and Food Inspector, Toledo, Ohio.

"I placed a copy of your letter and of the letter from Casper Sacks, before the Board yesterday, but there was only opportunity to present the subject, and no action was taken. This morning I will send a copy of the two letters to Hon. Fred. Maynard, Attorney-General of Michigan: also a copy of each to the State Food Commissioner, Hon. Charles E. Storrs, Lansing; also to the Prosecuting Attorney of Branch county in which the city of Coldwater is."

April 15, 1895, Dr. Probst again wrote to the Secretary of this Board as follows:—

"Your letter of the 13th inst., informing me that my letter with reference to diseased meat sent from Coldwater, Mich., to Toledo, O., had been referred to the Attorney-General, Food Commissioner of your State and to the Prosecuting-Attorney of Branch County, Mich., was duly received. Please accept my thanks for the same. I should be pleased to know if any action is taken in this case. It would seem to indicate, if the facts are as stated, the necessity for national legislation on this subject."

April 29, 1895, Wm. H. Compton, Prosecuting Attorney of Branch county, wrote to the Secretary of this Board as follows:—

"I have investigated as fully as I have been able at this time, the matter against Milnes and Miller of this City, accused of selling diseased meat. I have the statement of 'Armour's' traveling man, the one they made the arrangement with in relation to the meat, and he said they sent it to Toledo for the purpose of inspection and not for sale, and Miller of the firm says the same thing, so it leaves us without any evidence against them other than the fact of their shipping the beef. I don't think there is any doubt whatever that the beef was unfit for food, but I can find no evidence that the firm sold or offered to sell the same to any one. I am at your service for any further investigation of the matter that you may deem advisable."

SMALL-POX (VARIOLA) IN MICHIGAN, IN 1895.

During the year ending December 31, 1895, there were reported to the Secretary of the State Board of Health 23 outbreaks of small-pox in 21 localities in Michigan, which resulted in 187 cases with 47 deaths. For the same year (1895) there were reported to the Secretary of State 71 deaths from small-pox, or 24 more than were reported to this office.

Small-pox cases come under the direct supervision of the health officer, and reports of cases of and deaths from this disease are made to the Secretary of this Board with greater accuracy than for any other disease. This led the Secretary of the State Board of Health to believe that there was some error in the number of deaths from small-pox reported to the Secretary of State for 1895. An examination of the mortality returns made to the Secretary of State, from Wayne county, for 1895, revealed the fact that deaths from small-pox had been duplicated, so that in place of 64 deaths, the records should have shown 18 less, or 46 deaths from small-pox. The reports to the Secretary of the State Board of Health showed 40 deaths from small-pox in Wayne county, or 6 less than the corrected returns to the Secretary of State would have shown, if corrected for these instances of duplication. Duplication occurred in some instances by the same death being reported from two separate wards of the city of Detroit; and, in other instances, the same death was reported from one or more wards and also from the isolation hospital. From the foregoing statement it is apparent that the returns to the Secretary of this Board were more accurately made than were the returns to the Secretary of State.

SMALL-POX IN 1895, COMPARED WITH PREVIOUS YEARS.

According to Reports made to the Secretary of the State Board of Health.

Comparisons with previous years, to ascertain the comparative increase or decrease of the prevalence of small-pox in this State, is interesting, for, as shown in Table 1, there is a great variation, small-pox being ordinarily a rare disease in Michigan.

By reference to Table 1, it will be seen that cases and deaths from small-pox were not very numerous in Michigan from 1884 until 1894, in which latter year this disease assumed considerable importance in this State as part of a general epidemic of small-pox which extended over the Northern States. In 1895 the prevalence was much less than in the previous year but, compared with an ordinary year, small-pox might still be considered epidemic.

TABLE 1.—*Exhibiting for each of the twelve years, 1884–95, the number of reported Cases of and Deaths from Small-pox in Michigan; the number of localities where the disease was present, and the per cent of cases which proved fatal. Compiled in the Office of the Secretary of the State Board of Health, from reports made by local health officers.*

Years.	No. of localities.	Cases.	Deaths.	Deaths per 100 Cases.
1884	5	22	3	13.6
1885	9	27	6	22.2
1886	4	24	7	29.2
1887	2	4	0	0.0
1888	11	42	6	14.3
1889	14	57	4	7.0
1890	2	2	0	0.0
1891	3	3	0	0.0
1892	1	1	1	100.0
1893	2	10	3	30.0
1894	36	285	60	21.1
1895	21	187	47	25.1
Total twelve years	110	664	137	20.6

According to the Reports made to the Secretary of State.

Table 2 shows the number of deaths from small-pox per 10,000 persons living, reported to the Secretary of State. A diagram graphically representing the figures contained in this table for the 26 years, 1869–94, is printed on page 383 of the Annual Report of this Board for 1895.

TABLE 2.—*Exhibiting the number of reported deaths from Small-pox per 10,000 persons living in Michigan in each of the 27 years, 1869–95. Compiled from the Secretary of State's Vital Statistics of Michigan.*

Year.	1869.	1870.	1871.	1872.	1873.	1874	1875.	1876.	1877.	1878.	1879.	1880.	1881.
Deaths	.38	.08	.61	2.40	.71	.14	.19	.53	.69	.04	.04	.02	.49

Year.	1882.	1883.	1884.	1885.	1886.	1887.	1888.	1889.	1890.	1891.	1892.	1893.	1894.	1895.
Deaths	.58	.03	.02	.02	.03	0	.02	.02	.03	.01	.01	.01	.38	.31

DISTRIBUTION OF SMALL-POX BY DIVISIONS AND COUNTIES DURING 1895.

Table 3 exhibits the distribution of small-pox in 1895, by divisions of the State, and Table 4 exhibits the reported small-pox by counties for the same year. Further on in this article is an exhibit of the cases and deaths in the localities in each county where small-pox occurred.

TABLE 3.—*Exhibiting the Population of Michigan for the year 1895, by tiers of counties (Upper Peninsula as one tier); also the number of cases of Small-pox* REPORTED *from each of these divisions for 1895, and the number of cases per 10,000 estimated population of each division.*

Counties in Groups, most Northern ones First.		Estimated Population, 1895.*	Reported Cases of 1895.	Reported Cases per 10,000 of Population.
State		2,278,579	187	.82
Upper Peninsula	Alger. Delta. Schoolcraft. Luce. Houghton. Ontonagon. Gogebic. Baraga. Marquette. Iron. Menominee. Dickinson Mackinac. Chippewa. Keweenaw.	213,073	0	0
Eleventh tier of counties	Emmet. Charlevoix. Cheboygan. Presque Isle.	43,372	0	0
Tenth tier of counties	Leelanaw. Antrim. Otsego. Montmorency. Alpena.	48,721	0	0
Ninth tier of counties	Benzie. G'd. Traverse. Kalkaska. Crawford. Oscoda. Alcona.	42,933	0	0
Eighth tier of counties	Manistee. Wexford. Missaukee. Roscommon. Ogemaw. Iosco.	67,590	0	0
Seventh tier of counties	Mason. Lake. Osceola. Clare. Gladwin. Bay. Huron. Arenac.	157,735	0	0
Sixth tier of counties	Oceana. Newaygo. Mecosta. Isabella. Midland.	92,559	0	0
Fifth tier of counties	Muskegon. Montcalm. Gratiot. Saginaw. Tuscola. Sanilac.	250,905	0	0
Fourth tier of counties	Ottawa. Kent. Ionia. Clinton. Shiawassee. Genesee. Lapeer. St. Clair.	384,315	5	.13
Third tier of counties	Allegan. Barry. Eaton. Ingham. Livingston. Oakland. Macomb.	231,765	9	.39
Second tier of counties	Van Buren. Kalamazoo. Calhoun. Jackson. Washtenaw. Wayne.	514,449	172	3.34
First tier of counties	Berrien. Cass. St. Joseph. Branch. Hillsdale. Lenawee. Monroe.	231,167	1	.04

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* Population estimated by average annual increase (arithmetical method), based on U. S. Census of 1890 and the State Census of 1894, computed in the office of the State Board of Health.

TABLE 4.—*Number of Cases and Deaths reported from Small-pox per 10,000 persons living in each county in Michigan (from which Small-pox was reported) during the year 1895. (Compiled from reports of health officers, clerks, etc.)*

Counties.	Estimated population of Michigan for 1895.*	Number of reported		Number per 10,000 population, of		Counties.	Estimated population of Michigan for 1895.*	Number of reported		Number per 10,000 population, of	
		Cases.	Deaths.	Cases.	Deaths.			Cases.	Deaths.	Cases.	Deaths.
State	2,278,579	187	47	.82	.21	Ionia	35,325	1	0	.28	0
						Kalamazoo	42,752	1	1	.23	.23
						Kent	124,942	1	0	.08	0
Allegan	39,246	1	0	.25	0	Oakland	43,034	6	0	1.39	0
Calhoun	48,465	22	5	4.54	1.03						
						St. Joseph	25,020	1	0	.40	0
Clinton	26,200	3	0	1.15	0	Washtenaw	43,834	1	0	.23	0
Eaton	32,749	2	1	.61	.31	Wayne	301,298	148	40	4.91	1.33

* Population estimated by average annual increase, (arithmetical method), based on U. S. Census of 1890 and the State Census of 1894.

Sickness-rates from Small-pox Reported as having Occurred in 1895.

Considering the State by tiers of counties, Table 3 shows that most of the sickness from small-pox in 1895 was in the southern part of the State. The cities of Detroit and Battle Creek seem to have been the principal foci of infection, they having a large majority of the cases. In other localities the outbreaks were restricted to a single case or to a very few cases. Table 4 shows that the highest sickness-rate was in Wayne county, 4.91 cases per 10,000 inhabitants. For the city of Detroit the sickness-rate was 5.45; for Wayne county excluding Detroit the rate was 2.52 per 10,000 inhabitants.

In Calhoun county the sickness-rate was 4.54; in the city of Battle Creek it was 10.56; in Calhoun county excluding Battle Creek it was 1.55 per 10,000 inhabitants. The lowest sickness-rate given in Table 4 is in Kent county, .08 of a case per 10,000 inhabitants; this was from the presence of a single case in the city of Grand Rapids.

Death-rates From Small-pox Reported as having Occurred in 1895.

The highest death-rate from small-pox in 1895 was in Wayne county, 1.33 deaths per 10,000 population; the next highest death-rate was in Calhoun county, 1.03. The only other counties where deaths occurred from small-pox, in 1895, were, Eaton .31 and Kalamazoo .23 of a death per 10,000 inhabitants.

NUMBER OF OUTBREAKS OF SMALL-POX IN EACH MONTH OF THE YEAR 1895.

TABLE 5.—*Exhibiting the reported number of outbreaks of Small-pox which Began, the number which Ended, and the number of outbreaks which were Present, in each Month of the Year 1895, in the different local jurisdictions of Michigan.*

Outbreaks.	Jan.	Feb.	Mar.	Apr.	May	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.	Year.
Number began	6	0	3	1	2	1	0	2	2	2	1	1	21
Number ended	1	5	2	3	0	1	1	0	3	2	0	3	21
Number present	6	7	5	4	3	4	3	4	6	5	4	5	......

The last line of figures, in Table 5, representing the reported number of outbreaks present, is not derived from the preceding two lines, as might be supposed, but is obtained by actual count of the number of outbreaks reported as existing in each month. Frequently the beginning of an outbreak is reported but the end of the outbreak is not reported; and sometimes the month in which the outbreak ended is given without giving the date of the beginning of the outbreak. In either case the outbreak may have begun and ended in the same month, or it may have extended through several months. There were the same number of beginnings as endings of outbreaks reported during the year 1895.

The first line of figures, in Table 6, shows the number of cases reported sick in any part of each month.

As some of the cases were sick longer than one month they are included in the cases sick in more than one month, therefore the sum of the cases sick in all the months exceeds the total of reported cases in 1895; and the sum of the last line of figures in Table 6 exceeds 100.

The last line of figures, in this table (6), shows the per cent the cases sick in each month are of the exact number of cases *reported* to this Office for the year 1895.

TABLE 6.—*Exhibiting the Number and Per Cent of Cases of Small-pox in Michigan in each Month during the Year 1895. (Includes each case for which the time during which it existed, was stated in the reports. Each of such cases is counted in each month in which, or part of which, the case was reported to have existed.)*

	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Number of cases sick in any part of the month	83	48	13	21	31	15	3	17	24	17	9	7
Per cent the cases sick in each month were of total reported cases	44.4	25.7	7.0	11.2	16.6	8.0	1.6	9.1	12.8	9.1	4.8	3.7

SOURCE OF CONTAGIUM OF CASES OF SMALL-POX.

Of the 187 cases of small-pox reported during the year 1895, as exhibited in the following table, the local health officers reported the source of contagium as follows:—Traced to a former case, 50; probably traced to a former case, 5; continued from 1894, 5; from outside jurisdiction, 4; probably from outside jurisdiction, 3; from Europe, 1; unknown, 119.

TABLE 7.—*Reported Source of Contagium of Cases of Small-pox in 1895.*

Traced to a former case	50
Probably traced to a former case	5
Continued from 1894	5
From outside jurisdiction	4
Probably from outside jurisdiction	3
From Europe	1
Unknown	119
All cases	187

MOVEMENTS OF CONTAGIUM OF SMALL-POX.

The following Table (8) shows the sources of small-pox contagium and the localities in Michigan to which the disease spread, as reported by health officers who were able to trace the contagium into their jurisdictions from localities outside the State, or from other jurisdictions within the State.

TABLE 8.—*First and second localities, where the second locality was infected with Small-pox from the first, and the numbers of cases and deaths from Small-pox in the first and second localities, with the dates of the beginning and ending of each outbreak. (Compiled from reports of health officers who were able to trace the source of contagium to other localities.)*

Number.*	First Localities from which Small-pox was spread.			Second Localities infected from First.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
1	Calhoun county: Battle Creek city (May 2-Oct. 14.)	17	3	Calhoun county: Battle Creek township (Sept. 10-Oct. 12.)	3	1
				Bedford township (Aug. 29-Sept. 23.)	1	0
				Marshall city (Sept. 14-Sept. 23.)	1	1
				Eaton county: Olivet village (May 18-July 10.)	2	1
2	Wayne county: Detroit city (Jan., 1895-Apr. 18, 1896)	148	50	Oakland county: Pontiac city (Jan. 16-Feb. 11.)	1	0
				Rochester village (Oct. 18-Dec. 10.)	2	0
				Washtenaw county: Ypsilanti city (Mar. 10-Mar. 23.)	1	0
				Wayne county: Plymouth village (Jan. 1—Jan. 31.)	4	1

*These consecutive numbers refer to corresponding consecutive numbers preceding paragraphs, further on, which state the details and the names of the health officers reporting the facts.

TABLE 8.—CONTINUED.—*Movement of Infection of Small-pox* **Into Michigan** *from outside the State.*

Number.*	First Localities from which Small-pox was spread.			Second Localities infected from First.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
3	Chicago	----	----	Kent county: Grand Rapids city (Mar. 1-Apr. 20.)	1	0
4	Indiana: Marion	----	----	St. Joseph county: Park township (Nov. 24-Dec. 16.)	1	0
5	Steamship "Laurentian:" Allen and State Line, Londonderry to Halifax.			Wayne county: Detroit city (Dec. 8-Dec. 30.)	1	0

TABLE 8.—CONCLUDED.—**Probable** *Movement of Infection of Small-pox.*

Number.*	First Localities from which Small-pox was spread.			Second Localities infected from First.		
	Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
6	Calhoun county: Battle Creek city (May 2-Oct. 14.)	17	3	Kalamazoo county: Charleston township (Aug. 17-Sept. 2.)	1	1
7	Wayne county: Detroit city (Jan., 1895-Apr. 18, 1896.)	148	50	Wayne county: Brownstown township (Apr. 5-Apr. 30.)	3	2
				Highland Park village (Jan. 4-Mar. 15.)	3	0

* See foot-note on first page of table 8.

Outbreaks Traced to a Former Case Outside the Jurisdiction.

The following are extracts from reports of health officers who were able to trace the outbreaks of small-pox in their respective jurisdictions to cases of the disease outside their jurisdictions,—with the name of the health officer, and of the jurisdiction, subjoined. These quotations concerning the spread of contagium from first to second localities, are arranged in the same order as the "First Localities" in Table 8, thus giving the source of each report. The quotations are in answer to the question on the final report "The source of contagium, and the mode of introduction of the disease into my jurisdiction":—

1. "From city of Battle Creek."—*Geo. R. Peet, health officer, Battle Creek township, Calhoun county.*

1. "Contracted at Battle Creek city. Since making my last report I have ascertained that our patient visited a case of small-pox, at Battle Creek, knowingly."—*C. C. Smith, M. D., Bedford township, Calhoun county.*

1. "Exposed nine days before in Battle Creek, but was not aware just how; did not know when he came in contact with it."—*E. J. Marshall, M. D., Marshall city, Calhoun county.*

1. "Brought from Battle Creek city."—*J. S. Newland, M. D., Olivet village, Eaton county.*

2. "Disease was contracted by contact with the disease in Detroit, Mich."—*N. B. Calvin, M. D., Pontiac city, Oakland county.*

2. "From Detroit."—*J. E. Wilson, M. D., Rochester village, Oakland county.*

2. "Patient had been visiting in Detroit."—*F. K. Owen, M. D., Ypsilanti, Washtenaw county.*

2. "First patient contracted the disease in Detroit. Was treated first four days of illness for measles. The other three members of the family were brought in contact with the disease."—*J. M. Collier, M. D., Plymouth village, Wayne county.*

Movement of Infection from Outside the State.

3. "Brought from Chicago."—*W. A. Wilson, Sec'y., Grand Rapids city, Kent county.*

4. "Visitor from Marion, Ind."—*Chas. Barninger, M. D., Park township, St. Joseph county.*

5. "Passenger on steamship 'Laurentian,' from Londonderry."—*S. P. Duffield, M. D., Detroit, Wayne county.*

Probable Movement of Small-pox Infection Within the State.

6. "Supposed to be from a barber shop in Battle Creek, where he was shaved and had his hair cut, he having been no where else."—*Henry B. Pearce, health officer, Charleston township, Kalamazoo county.*

7. "The first patient was taken sick in Detroit; had not been exposed to small-pox that she knew of; came home and in five days developed small-pox."—*John L. Near, M. D., Brownstown township, Wayne county.*

7. "Unknown, but probably from exposure in the city of Detroit."—*A. Stewart, M. D., Highland Park village, Wayne county.*

PERIOD OF INCUBATION IN SMALL-POX.

TABLE 9.—*Exhibiting the reported Period of Incubation, stated in days, in 12 cases of Small-pox. Compiled from reports of health officers in Michigan, for the year 1895.*

Incubation period—Days	7	9	10	12	13	14
Cases in each period	1	1	1	*3	3	3

* In one of these cases it was reported as about 12 days.

The average of the above 12 reported periods of incubation is about 12 days.

TABLE 10.—*Exhibiting, relative to 4 instances of Small-pox in Michigan in 1895, the Reported Period of Incubation, within certain limits, stated in days; also the Means, the average of which may represent the average Period of Incubation.*

Days.	Means.	Days.	Means.	Days.	Means.	Days.	Means.
8 to 16	12	10 to 14	12	10 to 14	12	14 to 16	15

The average of the means, for the 4 instances, is 12.8 days.

AGES OF GREATEST PREVALENCE OF, AND MORTALITY FROM SMALL-POX.

The reports of local health officers in Michigan for the year 1895, gave the ages of 105 persons who were sick with small-pox, and of 20 persons who died of that disease. Table 11 represents, in certain age-groups, the numbers of cases and of deaths from small-pox; the per cent that the cases in each group were of all cases; the per cent that the deaths in each group were of the cases in that group; the per cent that the deaths in each group were of all deaths; and the per cent that the deaths in special groups were of all deaths—compiled from all reports for the year 1895 which stated the ages.

By this table (11) it may be seen that the greatest proportion of cases of small-pox was in persons from birth to five years of age, 20 per cent of all cases having occurred in that five-year age-period. In the ten-year period from 5 to 14, there occurred 27.6 per cent of the cases; and in the fifteen-year period, from 15 to 29, there occurred 30.5 per cent of the cases.

The greatest proportion, 30 per cent of all deaths, occurred in the period from birth to five years of age. In the ten year period from 5 to 14 years there occurred 10 per cent of the deaths, and in the ten year period from 15 to 24 there occurred 30 per cent.

The average age at death from small-pox, in the year 1895, was 21.8 years for males and 17.6 for females.

TABLE 11.—*Exhibiting, in certain Age-Groups, the number of Cases and the number of Deaths from Small-pox; the per cent that the Cases in each group were of All Cases; the per cent that the Deaths in each group were of all Deaths; and the per cent that the deaths in each group were of the Cases in that group.—Compiled from all reports for the year 1895, which stated the ages.*

	Number and per cent of Cases and Deaths in certain Age-groups.																		
Ages in groups of Years	All Ages.	0-1.	1-2.	2-3.	3-4.	4-5.	0-5.	5-9.	10-14.	15-19.	20-24.	25-29.	30-34.	35-39.	40-44.	45-49.	50-54.	55-59.	Over 60.
No of cases	*105	3	2	6	6	4	21	16	13	10	13	9	4	7	4	1	2	1	4
Per cent the cases in each group were of all cases.	100	2.9	1.9	5.7	5.7	3.8	20.0	15.2	12.4	9.5	12.4	8.6	3.8	6.7	3.8	1.0	1.9	1.0	3.8
No. of deaths	*20	3	0	2	1	0	6	1	1	3	3	0	2	1	1	0	0	0	2
Per c't the deaths in each group were of cases in that group	19	100	0	33.3	16.6	0	28.6	6.3	7.7	30.0	23.1	0	50.0	14.3	25.0	0	0	0	50.0
Per c't the deaths in each group were of all deaths	100	15	0	10	5	0	30	5	5	15	15	0	10	5	5	0	0	0	10
Per c't the deaths in special groups were of all deaths	......	30						10		30		20				10			

* Does not include those cases or deaths where the age was not stated.

AVERAGE DURATION OF SMALL-POX.—FATAL AND NON-FATAL CASES.

TABLE 12.—*Exhibiting by Sex of patient, the duration (in days) of fatal cases of sickness from Small-pox, in Michigan during the years, 1894–5. Arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Fatal cases of Small-pox.										
Year.	Sex.	No. of cases included.	Duration of sickness:—Per cent of Deaths in each Period of days.							
			All cases.	1 to 5.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.
1894.	Males	15	100	6.7	46.7	40.0	6.7	0	0	0
	Females	12	100	8.3	25.0	41.7	16.7	0	0	8.3
1895.	Males	13	100	7.7	38.5	23.1	15.4	0	15.4	0
	Females	5	100	0	60.0	20.0	0	20.0	0	0

The average duration of fatal cases of small-pox in 1895 was 12.9 days for males and 10.8 days for females.

TABLE 13.—*Exhibiting by Sex of patient, the per cent of cases which recovered in specified periods of time, the duration (in days) of Non-fatal cases of sickness from Small-pox in Michigan, during the years, 1894–5. Arranged in five-day groups. (Compiled from those reports which stated the length of time the patient was sick.)*

Non-Fatal Cases of Small-pox.																
Year.	Sex.	No. of cases included.	Duration of Sickness:—Per Cent of Cases in each Period of Days.													
			All cases.	1 to 5 days.	6 to 10.	11 to 15.	16 to 20.	21 to 25.	26 to 30.	31 to 35.	36 to 40.	41 to 45.	46 to 50.	51 to 55.	56 to 60.	Over 60 days.
1894.	Males	40	100	7.5	7.5	12.5	15.0	10.0	12.5	15.0	0	5.0	7.5	0	5.0	2.5
	Females	23	100	0	21.7	4.4	17.4	26.1	13.0	0	4.4	13.0	0	0	0	0
1895.	Males	36	100	0	5.6	16.7	11.1	22.2	13.9	16.7	5.6	2.8	2.8	0	2.8	0
	Females	33	100	0	0	9.1	9.1	21.2	24.2	15.2	0	12.1	0	3.0	3.0	3.0

The average duration of non-fatal cases of small-pox in 1895 was 25.2 days for males and 29.8 days for females.

OUTBREAKS OF SMALL-POX IN MICHIGAN IN 1895, BY LOCALITIES.

The following is a list of the 21 localities in Michigan where outbreaks of small-pox occurred in 1895; they are arranged alphabetically by counties, and the numbers of cases and deaths are given in each instance:—

Localities.	Cases.	Deaths.	Localities.	Cases.	Deaths.
Allegan Co.:			*Kent Co.:*		
Watson Tp.	1	0	Grand Rapids	1	0
Calhoun Co.:			*Oakland Co.:*		
Battle Creek	17	3	Pontiac	1	0
Battle Creek Tp.	3	1	Rochester	2	0
Bedford Tp.	1	0	Royal Oak Tp.	1	0
Marshall	1	1	Southfield Tp.	2	0
Clinton Co.:			*St. Joseph Co.:*		
Bengal Tp.	3	0	Park Tp.	1	0
Eaton Co.:			*Washtenaw Co.:*		
Olivet Vil.	2	1	Ypsilanti	1	0
Ionia Co.:			*Wayne Co.:*		
Danby Tp.	1	0	Brownstown Tp.	3	2
			Detroit	134	36
Kalamazoo Co.:			Hamtramck Tp.	4	1
Charleston Tp.	1	1	Highland Park	3	0
			Plymouth	4	1
State				187	47

The following are detailed accounts of some of the outbreaks of small-pox in 1895, in which the facts reported appeared of sufficient interest and utility to demand such attention.

Outbreak of Small-pox in Watson township, Allegan county.

March 21, 1895 the Secretary of the State Board of Health received a telegram from Allegan, Michigan, as follows:

"Small-pox reported here, disputed, can you send expert immediately? —*John Germain, health officer of Watson.*"

This was received very late at night. The Secretary telegraphed as follows: "Isolate patient, vaccinate all exposed. Will try to send expert tomorrow."

March 22, the Secretary telegraphed Doctor George H. Granger, member of State Board of Health, as follows: "Small-pox reported at Watson, Allegan County, diagnosis disputed, want expert immediately, will you go and investigate?" The following reply was received: "Cannot leave my business. Have several very sick patients.—*Geo. H. Granger.*"

The same telegram sent to Doctor Granger was then sent to Doctor Victor C. Vaughan, member of State Board of Health, and reply was received as follows: "Cannot go. Ask Mulheron.—*V. C. Vaughan.*"

The same telegram was then sent to Doctor Samuel G. Milner, member of State Board of Health, and a reply was received as follows: "I cannot go, but Hazlewood will.—*Milner.*"

A similar telegram was sent to Mason W. Gray, M. D., member of State Board of Health, and the following reply was received: "Cannot go, try some one else.—*Mason W. Gray.*"

March 22, the following telegram was sent to John Germain, health officer of Watson, Allegan County, Michigan: "No member of Board could go. Doctor Cattermole of this office will reach Allegan 8:16 tomorrow morning.—*Baker, Secretary.*"

March 23, Doctor Cattermole telegraphed the Secretary of the State Board of Health, as follows: "One case diagnosed Varioloid. Sick ten days. Many persons exposed, but active measures are being taken in vaccination and isolation. Will start home tonight."

This experience teaches the difficulty of relying upon members of the State Board of Health, who are engaged in active practice as physicians, for service as Contagious-Disease Inspectors. In this instance every medical member of the Board was asked to go, and every one found it impracticable to do so. (It was impracticable for the Secretary to go, because of pressing official duties in the office of the Board, and especially as the Correspondence Clerk chanced to be absent.) This is only one of many instances, which are being constantly repeated, in which the need of a State Communicable-Disease Inspector is rendered imperative.

Dr. Cattermole's report of the investigation was substantially as follows:—

The patient was a boy 12 years old, living in Watson township, about 4 miles from the village of Allegan. He had been sick about 10 days. Was taken sick at the district school, March 13; the next day he remained at home, suffering from severe pains in his back and legs, vomited, and had epigastric pains which lasted for several days. His mother told me that he had fever and that his feet began to swell at that time; they were still swollen when I saw him ten days after he was taken sick.

His mother says, the rash appeared first Saturday evening, March 16, as red spots on the face. Sunday, March 17, Dr. W. E. Albright, of Allegan, was passing the house, and they called him in to see the boy. He called it a case of the "grippe"

On this same Sunday there were a number of the neighbors in the house, and the neighbors visited the house as late as Tuesday, March 19, when an old lady said it was a case of "Dutch measles;" this alarmed the mother, and on Wednesday, March 20, they sent to Allegan for Dr. Russell, to come out and see the case. He saw the boy Wednesday evening, and says the case then presented the vesicular stage of varioloid.

Dr. Russell telephoned to Grand Rapids that evening for vaccine points, and the next morning went to the G—n home accompanied by Dr. Edward Amsden, who had had considerable experience with small-pox during the war. Dr. Amsden concurred in the diagnosis of varioloid, and the doctor at once vaccinated such members of the family as were then at home.

The family consists of the father, who was then in Allegan (he was vaccinated that same day), the mother and five boys (including the sick child),—ages of boys from five to twenty-one,—were all vaccinated on Thursday morning; a daughter, who works in Allegan was at home on Sunday and then returned to her place in town, but was sent home Saturday evening, March 23. The father went home at the same time, as the people of Allegan objected to his remaining in that village.

When I saw the case on Saturday morning, March 23 (the tenth day of the disease), the boy had a temperature of 101-1-2 F. Tongue coated, pain in the epigastrium. Over the face, ears, hands, and especially about the elbow and knee joints, there were numbers of dark red scabs from the size of a grain of wheat to that of a pea (1 to 3 tenths of an inch). The scabs were raised above the surface of the skin, dry and hard to the touch and having an indurated base. Those crusts which had not been disturbed by scratching, presented slight umbilication. Only one spot had the appearance of pustule, the others being uniformly dark red in color. The only symptom which seemed to be lacking to make it a well defined case of small-pox was the abortion of the case before reaching the stage of pustulation. The boy has a large scar on the left arm, the result of vaccination less than two years ago.

We returned to Allegan, and met some neighbors of S. P. Albertson, health officer of Watson township, conversed with them relative to what the State Board of Health would recommend them to do in this case. I sent my credentials and a marked copy of the pamphlet. "The Work of Health Officers and of Local Boards of Health in Michigan" to Mr. Albertson, saying, that if the local health officials were still dissatisfied with the diagnosis of the case, that the Secretary of the State Board would recommend them to employ Dr. John Mulheron of Detroit, or Dr. Arthur Hazlewood of Grand Rapids, as expert, but that under the circumstances, the fees and expenses of these gentlemen could not be defrayed by the State Board of Health.

Dr. Russell offered to vaccinate all persons who had been exposed, if Mr. Albertson would have them meet at the district school house next day (Sunday), and notify him when to meet them there. Dr. Russell telephoned to Grand Rapids for vaccine points, which were received Saturday evening.

I expected to meet Mr. Albertson on Saturday afternoon, but he did not come into town. On Sunday morning, I am told, he called at Dr. Russell's house to say that the children of school district No. 10, would meet the Doctor at the school building that afternoon. I did not see him, and he was not at the school house that afternoon. I accompanied Dr. Russell that day, and we vaccinated 68 persons, mostly children in attendance at that school. Many of them received primary vaccination.

The children had been there to school the Friday before, but the parents who were present promised to close the school for at least two weeks, and then if no new cases occurred, to use it only after thorough fumigation with sulphur.

As to the probable source of contagium in the case of Eddie G—n, all that we could learn was, that his father traveled about the country most of the time, coming in contact with all classes of people; he also visited Grand Rapids since the outbreak of small-pox in that city.

The teacher in the district school spends his Saturdays and Sundays in Otsego, where there are some paper mills (these paper mills are thought to have been the source of an outbreak of small-pox which occurred in Otsego about two years ago, in which there were several cases and one death).

John S—y, who lives on the adjoining farm to that occupied by John G—n, has a son who works in the Otsego paper mills; he usually spends Sunday at his father's home. One of S—y's daughters, a girl about fifteen years old, attends the village school at Otsego; she spends her Saturdays and Sundays at home. About three weeks ago this girl had what they say was German measles, and her two younger sisters had the rash a few days later; the two younger girls attend the district school (No. 10). Their mother says, the rash lasted about two days; the girls were not very sick. They said, the "German measles," had prevailed in the Otsego schools for some time.

After vaccinating as stated above, and explaining such methods of restriction—vaccination, isolation and disinfection—as are recommended by the State Board of Health, I left the neighborhood Sunday evening. The case of Eddie G—n was doing well and in good way for a speedy recovery; there were no new cases reported.

I left Allegan on Monday morning, without gaining any more information.

I am, yours very respectfully,

Geo. H. Cattermole.

In the health officer's final report of the outbreak, made April 17, 1895, he stated, that the clothing, bedding, etc., had been fumigated with sulphur; the patient was confined to one room, his parents acting as nurses; other methods of prevention were employed, as prompt vaccination and posting of notices; that only the one case had occurred.

Outbreak of Small-pox in Battle Creek.

Small-pox broke out in Battle Creek, May 2, 1895, and cases continued until Oct. 14 of the same year. The source of contagium was not definitely known; the health officer stated that it was supposed to be from a tramp. There were 17 cases with 3 deaths in the outbreak.

The citizens of Battle Creek were very much dissatisfied with the way the cases were cared for. Numerous letters were received from physicians and residents of that city complaining of carelessness on the part of attending physicians. It was alleged that physicians carried the infection in their clothing.

The small-pox tent was located near a residence part of the city and small-pox broke out in one of the houses near it; following this the State Board of Health was petitioned by residents of that part of the city to use its influence in having the small-pox tent removed to a more remote locality.

Parties visiting in Battle Creek contracted the disease and carried it to their home in the village of Olivet, Clinton county. This spread of infection is presented in the following letter, of May 20, from the Secretary of this Board to the health officer of Battle Creek:—

"This morning a telephone message was received from the authorities at Olivet, saying that a Mr. H—n, wife and three children had just returned from a visit to the family of Mr. A—n, where Anna A—n was sick with small-pox. It was understood that the disease was supposed to be a typical case of chicken-pox, and that the mail carrier on the route had been called in to see a typical case of small-pox.

"Just after dinner the authorities at Charlotte, telephoned that a man by the name of S—r, an employee at B—t's mill, Charlotte, had also been exposed to the disease while in Battle Creek during Saturday and Sunday.

"This seems to be the first information that this Office has received of the existence of small-pox in Battle Creek. By mail this morning I send you pamphlets, leaflets, etc., relative to the restriction of small-pox, which I hope may be of use to you. I hope you will keep this Office constantly informed respecting this outbreak.

"I cannot see how so many exposures could have occurred. I shall be glad to hear from you in detail, just what is being done toward the restriction and prevention of this disease.

"I send you herewith a leaflet relating to 'Now is a good time to be vaccinated.' I hope your local board will in accordance with act 146 laws of 1879 offer free vaccination and revaccination with bovine virus. Your board should also publicly recommend general vaccination and revaccination of all those who have not been successfully vaccinated within five years. You should in accordance with Act 137 laws of 1883 order the prompt vaccinnation or isolation of all persons who have been exposed to the disease, to order the prompt and thorough isolation of all those sick or infected with such disease so long as there is danger of their communicating the disease to others.

"I hope to have full information respecting this outbreak, as soon as practicable.

"If this Office can be of further service to you, it will give me pleasure."

S. S. French, M. D., health officer of the city of Battle Creek, wrote May 21, in answer to the above-quoted letter, from the Secretary of this Board, giving a detailed account of the first few cases in the outbreak, as follows:—

"Your packages relating to small-pox just received. I reported small-pox yesterday; the history of the cases we have is substantially as follows:—Miss A. A—— was taken sick on Thursday the 9th inst., while having care of children sick with chicken-pox; was taken home and Dr. McGuffin called Friday. Next day an eruption began on the face, it continued to spread; he called it chicken-pox (he had never seen a case). No report was made until the 17th, when I made an examination, found the case small-pox; it was denied by Dr. McGuffin, and another doctor of good repute, but next day early (I ordered strict quarantine the 17th) I put up the sign, ordered every body vaccinated and all who had been exposed quarantined. The case of S——, he left Sunday the 12th inst., having run away after being ordered Saturday night to stay in; his wife and children had not been to the house for a week as I am informed Immediately on learning of the matter I telegraphed to Charlotte and Olivet, and recommended that the parties be quarantined. The other case was very similar—a Mr. P——, was taken sick about the same time. He was a night help in a restaurant. Dr. Godfrey was called and when the eruption commenced he also said he was sure it was chicken-pox. He did not report until Friday the 17th. Quarantine was immediately ordered and has been strictly carried out in this case. Vaccination of all was done immediately; he has a trained nurse. The father of each of these patients has had small-pox. Each is being well cared for. All precautions are being used and will be continued. I have the police on the watch and when any person is found, who by any means has been exposed, he is isolated; three such I have found this morning. The doctors are all supplied with fresh bovine virus. I asked our board of health for orders to cause general vaccination free, particularly to those unable to pay. They put it off; should there be any new cases it will probably be done. The difference of opinion put off publication of the disease for one day only. I think chicken-pox should be reported as well as some other diseases, but it has never been done. I will give you the results as fast as they come."

May 22, 1895, the Secretary of this Board again wrote to Dr. French, as follows:

"I note what you say relative to chicken-pox.

"I note that you say that each case is well cared for, and that the father of each of these cases has had small-pox. In this connection I would respectfully call your attention to the fact that at Manchester, Michigan, the father of one of the cases of small-pox was not immediately vaccinated, having once had the disease, but was afterwards taken sick and died. I have in mind another instance at Green Bay, Wis., where a professor relying upon one attack of small-pox to prevent against another, took the disease and died while in attendance on a case of small-pox. These instances are quite numerous. I presume that you have already vaccinated the nurse and members of the family, whether they have had the small-pox or not. I merely offer this as a suggestion. If it has not been done I hope it will be, as soon as possible.

"I note you say the source of contagium is still a mystery. I hope you may be able to trace its source."

Cases of small-pox continued to occur, and reports were made to this Office by Dr. French. On Sept. 22, J. H. Kellogg, M. D., wrote to the Secretary of this Board, relative to the danger of small-pox being carried from Battle Creek to the Adventist camping grounds in Lansing. His letter was as follows:—

"I have learned from Dr. French that the rumor is abroad that small-pox has been generally diffused through our part of the city and that there is danger of its being communicated to the camp-ground at Lansing. I think it eminently proper that you should call attention to the matter and so write you to give you the facts.

"A few days ago one of our lady physicians reported to me that a patient whom she was attending in the next block had a suspicious eruption. She had already called Dr. French to see the case and he pronounced it suspicious. Measures were immediately taken to isolate the patient and everybody who had come in contact with her, including three or four nurses and several neighbors who had been in, some of whom are employed in the Sanitarium. We have a farm a half a mile away on which there is a house and we allowed the man to move his wife there while the case was under suspicion. In the course of a day or two it became very clear that the case was one of small-pox. She was then removed to the pest-house as the house where she was taken happened to be just outside the city limits, although nearly half a mile away and a very isolated place. Under the circumstances, I thought it best to prohibit our employees from attending the camp-meeting. I understand that there are a few who went early and who are on the ground; but they are persons who did not come in contact with the patient

"Where the lady contracted the disease is not known. Her husband had been sick two or three week before with a slight fever, thought by his attending physician to be a malarial fever and he says he had a slight eruption. A doctor and two of our nurses attended him. One of the nurses had been vaccinated, the other not, but neither of them contracted any disease. I have isolated both of these cases, although I presume unnecessarily so, for the reason that fully a month has passed since the man was sick. The man was confined only two or three days, was about his business I believe on the fourth day. If he really had the small-pox he must have come in contact with a good many people, but so long a time has elapsed since his recovery without any fresh outbreak, it seems quite clear either that he did not have the disease, or that no one with a possible exception of his wife, has contracted it from him.

"We have our entire family under careful observation and an inspection as regards health is made of every employee twice a day. I am keeping Dr. French carefully informed with reference to the entire situation and if anything new occurs, I will also write you, if you desire. But the present prospect is that there will be no further outbreak.

Dr. French seems to be taking every necessary precaution to stamp out the disease in the city and publishes a bulletin, giving full particulars every day.

"I should have added that all our employees have been vaccinated; the Board of Battle Creek College, across the street, has offered free vaccination to all the students and requests that all be vaccinated. Our doctors are doing the work gratuitously so as to encourage everyone to avail themselves of the opportunity."

The Secretary of this Board wrote to Dr. Kellogg, Sept. 25, 1895. in answer to the above-quoted letter, as follows:—

"Please accept cordial thanks for your letter of Sept. 22, relative to small-pox in Battle Creek, etc. I am glad to have your detailed facts regarding the condition of affairs, and to know that you have taken extra precautions. I am glad to know that 'Dr. French seems to be taking every necessary precaution to stamp out the disease.'

"In a newspaper report a few days since I was reported as saying that the spread of small-pox in and from Battle Creek was due to carelessness of the health authorities. This statement I never made, because I did not believe it was due to the carelessness of the health authorities of Battle Creek. I did say that it seemed that the disease had not been restricted as it should have been. The rule is that each outbreak is restricted to the first house in which the disease occurs.

Small-pox in the village of Olivet, Eaton county.

In the outbreak of small-pox which occurred in the village of Olivet, there were two cases with one death. The first case Benj. H—n, aged 36, visited in Battle Creek at the house of a person suffering from small-pox. He was taken sick May 29, and died June 13. A telephone message received at this Office, June 14, stated that Mr. H—n had died the night before; his body would be wrapped in a sheet saturated with bichloride solution and then interred at night, by persons who themselves had had small-pox. This Office cautioned the President of the village not to allow any one to go near the corpse, except those who had been recently successfully vaccinated or had recently had small-pox; that in the interment of Mr. H—n no person other than those absolutely needed should be present. He was informed that once having had small-pox was not proof against a subsequent attack.

June 12, the health officer of Olivet wrote to the Secretary of this Board as follows:—

"I just telephoned you about coming here. I, as health officer, am placed in a peculiar situation in relation to this small-pox case; as there are many questioning my decision, and if you will come it will decide the matter. Otherwise it will be bad for myself and the local board. I want you to come as soon as you can, without fail."

In response to the above-quoted request of the health officer of Olivet, the Secretary of this Board wrote June 13, as follows:—

"I don't quite see why your local board of health should care to have my opinion on the case, as they have all the jurisdiction they can wish for. As I understand it the case is of some standing, and it is only a question of relaxing the isolation of the patient. From the facts I have before me, and from the history of the exposure, etc., there is no doubt in my mind that your local board of health are doing right when they treat the case as small-pox. The cases at Battle Creek are undoubtedly small-pox.

"If I were to come there I would have to do it on my own responsibility, and slight my work here in the office. There is no provision for a communicable-disease inspector to be sent to localities in cases where there is a question of diagnosis, although the legislature has been earnestly requested to make such provision. I hope some day this Board may have such an officer, but he would have to be a person other than the Secretary, because the Secretary's official duties require his time in the office.

"Under the act under which the Board is now operating, the Board might send its Secretary or a committee of the Board, but the Board will not be in session until July 12, 1895, which is its next regular meeting. It would be impossible with the Board's present appropriation to comply with the demands similar to the one which you make. In rare cases where the public health and safety is jeopardized, the Board has sent its Secretary or a committee, but this is a different situation entirely, and I understand that the public health and life are not in danger; and, not to continue the isolation until all danger is past, would be unwise and would tear down the only safe-guard.

"I hope your board will continue to take precautions, which may save further spread of the disease—small-pox.

"If I can be of further service to you, it will give me pleasure."

One more case of small-pox occurred in the village of Olivet, after the above-quoted letter was sent to the health officer of that village; this second case recovered and with its recovery the outbreak terminated.

Small-pox in Charleston township, Kalamazoo county.

An outbreak of small-pox occurred in Charleston township, Kalamazoo county, in which there was only the one (fatal) case. The man probably contracted the disease in Battle Creek. Twelve persons were exposed but were vaccinated as soon as the case was recognized as small-pox; the vaccination "took" on only one of these persons but they all escaped the disease.

The case was well taken care of, isolation and disinfection being carried out intelligently. Henry B. Pearce, the health officer of the township, wrote to the Secretary of this Board, Sept. 4, asking for information, as follows:—

> "How ought carpets and furniture to be disinfected that were taken out of the house the day that the patient was breaking out with small-pox? The patient died Monday at about 7 A. M., and was buried same day about midnight."

The Secretary of this Board wrote, Sept. 6, in answer to the above-quoted letter, as follows:—

> "Relative to disinfection every thing that is liable to be infected should be thoroughly disinfected, and the rules relative to disinfection after diphtheria, will also apply to small-pox and I herewith enclose a marked copy of a pamphlet bearing upon the above-mentioned subject.
>
> "Relative to vaccination, if it did not work the first time it should have been tried several times, and all of those who were exposed should have been vaccinated or re-vacinated at least two or three different times.
>
> "Relative to the small-pox at Battle Creek, I am informed by the proper authority that all cases have been thoroughly isolated and under the care of experienced nurses, and all known to be exposed quarantined and vaccinated, and by order of the Board of Health that general vaccination has been done. There have been 13 cases of small-pox in Battle Creek, with 2 deaths, and 4 still sick."

From the health officer's final report it would seem that instructions were faithfully carried out; he stated that—The patient was isolated from all persons except his father and a nurse. In fumigating the premises 125 pounds of sulphur was burned. Discharges from the patient were buried in two places and a barrel of lime was put on each place. Carbolic acid and zinc solution were also used in disinfecting articles of bedding, clothing, etc. Only the one case occurred.

Small-pox in Grand Rapids.

One case of small-pox occurred in the city of Grand Rapids in the year 1895. The infection came from Chicago. The patient was sent to the hospital for contagious diseases. All persons who were exposed were vaccinated, and guards placed over them for 17 days. Disinfection was thorough. No other case occurred.

Small-pox in Bedford township, Calhoun county.

The outbreak of small-pox in Bedford township, Calhoun county, was restricted to the one case. The health officer reported relative to the source of infection as follows: "Contracted at Battle Creek. Since my last report I have ascertained that our patient visited a case of small-pox at Battle Creek, knowingly." All necessary precautions seem to have been taken—the patient was isolated; about 500 persons were vaccinated; and disinfection was attended to.

Small-pox in the city of Marshall.

A man was taken sick with small-pox in the city of Marshall, Sept. 23, 1895. He was in Battle Creek nine days before being taken ill, and probably contracted the disease there. He was promptly removed to a pest house; the health officer reported that about one-half the people in the city were vaccinated. The outbreak was restricted to this one case.

Small-pox in Bengal township, Clinton county.

Small-pox broke out in Bengal township, Clinton county, Dec. 27, 1894. The first case was in a man who had been in Detroit one week before. The patient was isolated as soon as the eruption appeared, and no one visited him except his wife and the physician. Four other persons who lived in the house were vaccinated at once, but of these two children had varioloid and a woman had variola. All of these cases recovered, and the disease was confined to the four cases.

Small-pox in Rochester village, Oakland county. Infection carried from Detroit.

An outbreak of small-pox occurred in the village of Rochester in which there were two cases. The source of infection in the first case was substantially, as follows: In Sept., 1895, a young man was visiting friends in Detroit, and was exposed to small-pox four days before he knew it. He was then vaccinated and stayed in Detroit for 15 days, being visited each day by a representative of the local board of health. At the expiration of the quarantine he was given a certificate and allowed to return home. He had some eruption on his face which the Detroit doctor said was vaccine rash. Two weeks after his return home his sister was taken sick with small-pox. About a month later another case occurred in the village without any apparent source of contagium. The cases were well cared for and both recovered.

Small-pox in Brownstown township, Wayne County.

An outbreak of small-pox occurred in Brownstown township, Wayne county, in which there were 3 cases with 2 deaths. The first case was that of a woman who had been in Detroit nursing her sister during a confinement. She was taken sick while in the city, started at once for her home in the country, was sick several days before the rash appeared and a diagnosis was made. Many persons were probably exposed. The three cases occurred in this family; one of the cases had been vaccinated the other two had not.

Small-pox in Royal Oak township, Oakland County.

The Supervisor of Royal Oak township, Oakland county, was taken sick with small-pox, Jan. 22, 1895. There had been small-pox cases in his jurisdiction in 1894, the last of which had recovered late in the year. The health officer in reporting the case states substantially, as follows, relative to the source of contagium: He had been in Detroit, January 12, with pay-checks for the physician and nurses who had attended cases in the Nov. and Dec. outbreak, and was taken sick Jan. 22, ten days after visiting Detroit.

The case was not isolated until after the eruption appeared. Other members of the family were exposed but did not contract the disease. Disinfection was thoroughly carried out after recovery of the patient.

A doubtful case of Small-pox in Park Township, St. Joseph County.

A suspected case of small-pox occurred in Park township, Oakland county, Nov. 24, 1895. The case was a man, 26 years old, who had been employed as druggist at the Soldier's Home, Lafeyette, Ind. A few days before he left the Home a number of filthy old soldiers had arrived there from Chicago. There is no evidence that they carried small-pox contagium. The young man went to Parkville, Mich., on Nov. 20, and was taken sick, Nov. 24. November 27 he visited Three Rivers, consulted Dr. Knowles of that city, who considered the case suspicious of small-pox. It was reported to the health officer at once, and he ordered the man to go back to Parkville; advised the fumigation of the railroad station at Three Rivers, and the station at Moorepark, where the man had taken the train; this request was complied with by the railroad company; he also telegraphed the facts to the Secretary of this Board.

On his return to Parkville the man came under the attention of Dr. C. E. Barninger who attended him until his recovery, which was only about two weeks later. All precautions were taken in the case. All exposed persons were vaccinated. No others contracted variola from him, but the health officer and others thought it might have been a case of chicken-pox, and that a little girl contracted chicken-pox from him.

Small-pox in Detroit.

Small-pox had been prevalent in Detroit in 1894, and the outbreak continued into 1895; there were 134 cases with 36 deaths in the city during the year. It is probable that the public health would have been better conserved if there had been less contention and change among the health authorities of the city. There was delay in providing a hospital for small-pox patients; the health officer was removed from office, and changes made in methods of quarantine, all of which were confusing and unsatisfactory.

Of especial interest in connection with small-pox in Detroit during the year 1895, was the occurrence of one case in a European immigrant. In the report of sickness in Detroit, made to this office, for the week ending Dec. 14, the health officer stated that one case of small-pox then in the city had contracted the disease on the steamship "Laurentian" from Londonderry to Halifax. The Secretary of this Board in a letter to Dr. Duffield, Dec. 16, 1895, said—"Relative to the case of small-pox contracted on the S. S. 'Laurentian' from Londonderry to Halifax, I would like very much to have a full statement relative to the route from Halifax to Detroit or any other information bearing either directly or indirectly upon the subject."

In reply to the above request from this Office, Dr. Duffield wrote Dec. 17, as follows:—

> "In answer to your inquiry relative to the case of Varioloid coming from Halifax—I have only to say: She came over the Canadian Pacific Railway; leaving there on Sunday Dec. 1, and reaching here Monday. My attention was not called by the family physician until Friday the 13th Dec., when I found her with papules developing on forehead, and with headache, high fever, and backache. Immediately endorsed the view of the physician who was in attendance on the case, that it was small-pox, and took her with her husband to the hospital. She is doing nicely. Her husband works at the American Eagle Tobacco Works; I had all the emyloyees vaccinated, etc., and am in hopes we have cut short any spread."

This shows the liability of communicable diseases being introduced into localities in Michigan by immigrants from infected localities of Europe, and demonstrates the importance of the great effort made by the State Board of Health, by a system of inspection of immigrants at the ports of entry, and the disinfection of their baggage, if they came from infected districts, by which methods the Board hoped to prevent the introduction of infection. The law under which that action was taken proved to be defective, so the effort had to be abandoned.

Instances where supposed Chicken-pox proved to be Small-pox.

In Battle Creek township where there were 3 cases and 1 death from small-pox in 1895, the township health officer, Geo. R. Peet, reported the source of infection as follows: "Brought in by little baby, from city of Battle Creek, supposed to have chicken-pox."

The first cases in the outbreak in Battle Creek were called chicken-pox, as will be seen by referring to the letter from the health officer of that city (on a previous page). A number of persons were exposed before the nature of the disease was known.

During the prevalence of small-pox in a community, it would be judicious to require that cases of chicken-pox be reported and placed under observation as suspected cases of small-pox, as many mild cases of the latter disease are mistaken for chicken-pox, and isolation of the patient neglected.

Who orders Free Vaccination?

Dr. Ora Manly, health officer of Springfield township, Oakland county, wrote the Secretary of this Board, Jan. 5, 1895, relative to free vaccination, as follows:—

"I ask you for information—can a health officer, if he thinks best, give notice that he will vaccinate the citizens of his township free of charge, or in other words at the expense of the town, and collect the same, without an order from the Supervisor of the township?

"At your request I vaccinated 200 persons of this town, at public expense, and some think it all wrong; please let me know who is right."

In reply to the above-quoted letter from Dr. Manly the Secretary of this Board wrote, Jan. 11, as follows:—

"The law says plainly (Section 1685, Howell's Statutes), 'That the board of health of each city, village and township may, at any time, *direct* its health officer or health physician to offer vaccination, with bovine vaccine virus, to every child not previously vaccinated, and to all other persons who have not been vaccinated within the preceding five years, without cost to the persons (person) vaccinated, but at the expense of such city, village or township, as the case may be.'

"The health officer must be *directed* by the board of health to do the work, before he can legally claim remuneration for his services. However, if the board of health see fit to audit his bill for such work, even if it did not 'direct' him to do it, he can collect pay."

CHICKEN-POX IN MICHIGAN IN 1895.

During the year, ending December 31, 1895, correspondence relative to existence of chicken-pox at three localities, was received at the Office of the State Board of Health, as follows:—At the Home for the Feeble

Minded and Epileptic at Lapeer; at the State Public School at Coldwater, and at Mayville village, Tuscola county.

The particulars relative to the outbreaks at the different localities will be found in the following correspondence:—

OUTBREAK OF CHICKEN-POX AT THE HOME FOR THE FEEBLE MINDED AND EPILEPTIC AT LAPEER.

In a letter to the Secretary of this Board, W. A. Polglase, M. D., Superintendent of the Home for the Feeble Minded and Epileptic at Lapeer, stated that there were present some cases of chicken-pox at the Home. In a subsequent letter, dated Oct. 28, Dr. Polglase stated "We still have some six cases of chicken-pox which were imported from the Coldwater school."

Oct. 30, Secretary Baker wrote to A. J. Murray, Superintendent of the State Public School at Coldwater, as follows:—

"Chicken-pox is present in the home for the Feeble Minded, at Lapeer, and I am informed that it was carried from the Coldwater School. I should like to hear from you relative to the subject and I herewith enclose a stamped envelope for reply."

Nov. 2, Mr. Murray replied as follows:—

"We have a few cases of chicken-pox and I presume it may have been carried from here. We have not regarded chicken-pox as especially 'Dangerous to Public Health.'"

Nov. 4, Secretary Baker replied as follows:—

"Your letter of November 2 relative to chicken-pox is before me, for which please accept thanks.

"While it may be true that chicken-pox is not especially dangerous to the public health, yet it is a fact that it has caused about the same number of deaths, as small-pox in Michigan in the ten years, 1882-1892, and another danger is the mistaken diagnosis of small-pox as chicken-pox and this last-mentioned danger is especially true. when small-pox is present in the State, as it now is."

November 4, Secretary Baker wrote to Dr. Polglase, stating in substance the contents of the letter he had received from Mr. Murray, and his reply to him.

OUTBREAK OF CHICKEN-POX AT MAYVILLE VILLAGE, TUSCOLA CO.

December 4, in a letter to Secretary Baker, B. C. Bradshaw, M. D., health officer of Mayville village, said:—

"We also have two cases of chicken-pox. Would you advise keeping the children, that belong to the family where they have the chicken-pox, out of school?"

December 5, Secretary Baker wrote to Dr. Bradshaw informing him wherein the danger from the disease lay, and continuing said:—

"If you wish to be absolutely on the safe side, you should isolate all sick or infected persons until the danger of their communicating the disease is over, and, considering the fact that small-pox is present in the State, I think it would be best to take every precaution possible and give the public safety the benefit of every doubt."

PUERPERAL FEVER IN MICHIGAN IN 1895.

During the year ending December 31, 1895, four cases of puerperal fever from three localities were reported to the Office of the State Board of Health as follows:—Fowler village, Clinton Co. (one case); Iron Mountain, Dickinson Co. (two cases); and Morenci village, Lenawee Co. (one case).

The correspondence relative to these outbreaks is as follows:—

OUTBREAK OF PUERPERAL FEVER AT FOWLER VILLAGE, CLINTON CO.

January 23, Geo. McPherson, M. D., wrote to the Secretary of this Board as follows:—

"Is there any lawful restriction placed on a doctor treating puerperal fever, aside from antiseptic cleanliness?

"Please let me know as soon as possible as there is a case in town and quite a good deal is being said concerning the duty of physicians treating those cases and waiting on others during confinement."

January 26, in reply, Secretary Baker wrote to Dr. McPherson as follows:—

"Your letter of Jan. 23, relative to puerperal fever * * * is before me.

"Relative to puerperal fever, it is classed with the dangerous communicable diseases, and unless a doctor observed the same or proper precautions in attending a case of puerperal fever, as in other dangerous communicable diseases, he would be liable to prosecution. * * * ."

OUTBREAK OF PUERPERAL FEVER AT IRON MOUNTAIN, DICKINSON CO.

June 10, Joseph A. Crowell, M. D., health officer of the city of Iron Mountain wrote to the Secretary of this Board as follows:—

"Today I received reports of two cases of puerperal fever, both attended by the same midwife in the same day. Shall I take any means to prevent her attending other cases, and what is the course generally pursued in such cases? * * * ."

June 12, Secretary Baker replied to Dr. Crowell as follows:—

"Your letter of June 10 relative to puerperal fever is before me, for which please accept thanks.

"Relative to allowing the midwife to attend other cases, I think you will have to use your own judgment, as there does not seem to be a well-settled practice relative to that subject. However I think there should be at least thorough disinfection of the *person* and *clothing* before permitting her attending other cases. * * * ."

OUTBREAK OF PUERPERAL FEVER AT MORENCI VILLAGE, LENAWEE CO.

November 28, Clarence McConnel, a citizen of North Morenci village wrote the Secretary of this Board as follows:—

"I am taking the liberty to ask you a question. In the month of Sept. '95, I rented a house and in the month of Feb. my wife was confined and was taken with childbed fever.

"A woman died of the fever in the same room my wife was confined in. The room was not renovated, and the paper had been on in this room 10 or 12 years.

"My wife did not take cold and had two good nurses and a good physician. He said it was caused by the condition of the room. He attended the woman that died previous to my wife's sickness. Does a person lay themselves liable for renting a house in that condition, if so, is there any redress for me? Awaiting an early reply, I remain."

November 29, Secretary Baker replied to Mr. McConnel, as follows:—

"Your letter of Nov. 29, relative to cases of puerperal fever is before me. I know of no statute law which makes a landlord liable for renting a house infected with a dangerous disease; there may be redress by common law. I would advise you to consult an attorney; I am not an attorney and could not give you a satisfactory answer. Perhaps no one can tell until tried by a jury."

CHOLERA INFANTUM.

Early in March, 1895, S. Rinehart, M. D., health officer of Ingersol township, Midland county, wrote to this Office as follows relative to an epidemic of cholera infantum in his jurisdiction:—

"I settled in this township Sept. 1st last. I have no means of knowing what occurred before that time.

"An epidemic of cholera infantum came on during that month. I attended 23 cases, no deaths. As many more went elsewhere. One died on the road to a neighboring physician * * * having no medical attendance before.

"Do I understand the word *Cholera*, in the blanks, to include cholera infantum?"

March 8, Dr. Rinehart again wrote to the Secretary of this Board as follows:—

"Your card informing me that cholera infantum is not considered an infectious disease, is received. * * *.

"I have been health officer and town officer off and on for twenty years, and have just discovered *in your card* that cholera infantum was omitted from the list as a disease dangerous to public health. It should be there, if not contagious and infectious.

"I am satisfied that there is something more than epidemia governing it. It is not a product of weather hot or cold. It is not a product of Vaughan's toxin of milk. It has been frequent here this winter in the coldest of weather as well as in the mild weather of September last. It attacks children at the breast, those fed on the bottle, children in their teens, adults and old age, with this difference: as age advances above about 5 or 6, it does not have a tendency to become chronic; yet the chronic diarrhea of the adult, commencing by cholera morbus, attacks of indigestion and dysentery, take the same course, assume the same conditions, show the same trains of symptoms, and die the same; and all subject to the same treatment by the average physician. With me it is antiseptic, added to the specific ideas of Scudder."

In reply to Dr. Rinehart's second letter the Secretary wrote, Mar. 9, as follows:—

"Your letter, March 8, is before me. The card from this Office to which you refer, has never been seen by me, having been sent out by a clerk into whose hands your annual report and accompanying letter were placed. I now have before me your report and accompanying letter, and my reply may not be the same as that made by the clerk on the postal card sent to you. I think the word 'cholera' may be understood to include cholera morbus and cholera infantum. I incline to the view, which you express in your letter, that these diseases will probably be found to be due to micro-organisms or to poisons created by such organisms. I would be glad to have annual and special reports include the number of cases of such diseases, and any other facts which may aid this Board in learning the causation and best means for prevention of those diseases."

TETANUS.

Sept. 28, 1895, W. A. Spirl, health officer of Burleigh township, Iosco county, wrote to the Secretary of this Board as follows, relative to a disease which was prevailing among young girls in his jurisdiction:—

"By request of citizens of the township of Burleigh, I write to you in regard to the sickness of three young ladies of this place that the doctors here do not seem to help. They are all alike or nearly so; one of them has been sick about two months, the other two about two weeks. They have spasms and fainting spells almost continually, and one of them has the lock-jaw and is now paralyzed, or has no feeling in any part of the body nearly half of the time, and it seems most impossible to get people to take care of them through fear. The reason I write is to ask if they can get any counsel from you."

Sept. 30, in reply to Mr. Spirl's letter, the Secretary wrote as follows:—

"From your description, it would seem probable that these young ladies are suffering from tetanus (lock-jaw) which is a dangerous disease caused by a micro-organism,—the tetanus bacillus. The disease generally comes from being inoculated by stepping on, or being injured by, an old rusty nail, glass, etc. The germ is also sometimes found in garden soil.

"I shall be glad to know the name of the attending physician or physicians, that I may correspond with them. If practicable for you to do so, it might be well to mention to the attending physician or physicians that I shall be glad to correspond with them on this subject.

"One letter on this same subject has suggested the possibility of hydrophobia. I wish you would thoroughly investigate the subject and let me know your findings. Ascertain if possible whether any rabies in animals has occurred, and see if any of these young ladies has been bitten by a mad dog, and any other facts you may be able to learn."

SYPHILITIC OZÆNA.

Oct. 4, 1895, W. L. Wilson, M. D., health officer of St. Joseph city, wrote to the Secretary of this Board as follows relative to a case of syphilitic ozæna in his jurisdiction:—

"We have in one of our schools here a boy suffering from syphilitic ozæna. The teacher complains so bitterly of the odor arising therefrom, that she has applied to the health board to have him kept out of school. Have we any power to do so, and if so on what grounds?"

Oct. 7, the Secretary replied to Dr. Wilson's letter as follows:—

"Your letter of Oct. 4, relative to a boy suffering from syphilitic ozæna, is before me.

"The State Board of Health has never formally declared syphilis to be a 'disease dangerous to the public health,' but I think there can be no doubt that it is such a disease. If so, then act number 137 laws of 1883 applies to that disease, and it is the duty of the health officer 'To order the prompt and thorough isolation of those sick or infected with such disease, so long as there is danger of their communicating the disease to other persons.'

"There may be among physicians difference of opinion as to whether the syphilitic ozæna which this boy has is such that 'there is danger of communicating the disease to other persons.' If you think that there is danger it is your duty to order him isolated. My own view is that I should not want a child of mine to attend school in the same room and especially not to use the same common drinking cup used by him.

"If by reason of the odor from him the boy is a nuisance in the school, you might recommend that the school board should make a rule excluding any person who for any reason should be a nuisance."

RABIES (HYDROPHOBIA) IN MICHIGAN IN 1895.

During the year ending December 31, 1895, information relative to three outbreaks of rabies came to the Office of the State Board of Health. The localities from which its presence was reported are Tittabawassee township, Saginaw Co., Colon township, St. Joseph Co., and Homer township, Midland Co. The facts relative to these outbreaks are given in the following correspondence:—

OUTBREAK OF RABIES IN TITTABAWASSEE TP., SAGINAW CO.

Alfred O. Bush, Clerk of Tittabawassee Tp., in a letter to the Secretary of this Board, dated Freeland, January 15, said:—

"Will you kindly inform me whether the board of health has any authority in the matter of dogs known to have been bitten by a mad dog. About six weeks ago there were 15 or 20 dogs bitten by a strange dog supposed to be mad. Last week one of them went mad.

"By request of the board of health of Tittabawassee."

January 16, Secretary Baker replied to Mr. Bush as follows:—

"Replying to your letter of Jan. 15, I send you herewith a pamphlet in which I have marked parts bearing upon the duty of the health officer or the local board of health for the prevention of rabies. Rabies is a disease 'dangerous to the public health' and should be reported to the health officer and restricted by him in accordance with Act 137 laws of 1883. If the disease occurs in animals, under no circumstances should the local board of health fail to guard the public health and life from this fearful disease,—this is required by section 6, Act 125, laws of 1889 (page 64 public health laws of Michigan). Whether in man or animals the disease should be promptly reported to the State Board of Health. If the disease is in animals it should be promptly reported to Hon. H. H. Hinds, President of the State Live Stock Commission, Stanton, Michigan. However, this time I have sent a copy of your letter to Mr. Hinds.

"All animals bitten by an animal known to be mad or suspected of madness should be isolated and kept under surveillance for at least five or six weeks, until it is known whether or not the animal bitten will develop the disease. Enclosed please find a stamped envelope for your reply. I shall be glad to have as complete information as practicable, as regards the history of this outbreak. Has the outbreak extended into other townships? If so, in what townships."

Under the same date, Secretary Baker wrote to Hon. H. H. Hinds, at Stanton, quoting in part Mr. Bush's letter.

January 17, Mr. Bush again wrote to Secretary Baker as follows:—

"Yours of 16th inst. recd. In reply would say that about six weeks ago a stray dog came through Freeland and would cross the streets and bite every dog that he could get at and one dog that he bit about ten days ago went mad and had to be killed. Then another dog 4 miles East and North of here, the direction from which this stray dog came, one day last week went mad and bit a large hog and several dogs. He also went over the Co. line into Williams Town, Bay Co. and bit two or three dogs. I got this news Saturday, the 6th of January, and called the Board of Health together and posted five notices warning all people having dogs in the Township to kill or securely tie them until further notice of said Board. Since then seven dogs have been killed, and there are still 5 or 6 that are known to have been bitten, running at large.

"Many thanks for your kindness in sending me so much light on the question, and if I do not hear from Commissioner Hinds soon will write him."

Outbreak of Rabies in Colon township, St. Joseph Co.

May 16, E. L. Godfrey, M. D., health officer of Colon Tp., wrote to the Secretary of this Board as follows:—

"At the present time, I believe our town to be free from all contagious diseases with the possibility of some trouble from hydrophobia. Two (2) dogs supposed to be rabid have been shot also several dogs shot that were bitten. One man bitten.—I am informed that he was taken to the county house. We have ordered dogs all either muzzled or confined, and dogs known to have been bitten shot."

May 18, in the absence of Secretary Baker, Mr. MacClure; cor. clerk, wrote to Dr. Godfrey as follows:—

"Please accept cordial thanks for your letter of May 16, relative to scarlet fever and hydrophobia, and for your final report.

"Doctor Baker is confined to his bed on account of sickness.

"Rabies is a disease dangerous to the public health, and should be restricted by the local board of health in occordance with Act 137 laws of 1883, whether in man or in animals. You should have also notified the President of the State Live Stock Commission—Hon. H. H. Hinds of Stanton, Michigan. However, in this case I have made a copy of your letter and transmitted it to Mr. Hinds. Your local board of health should take charge of the case in animals until relieved by the State Live Stock Commission, and should not in any way fail to guard the public health and life from this fearful disease. If an animal is suspected of rabies, it should be securely isolated; and, according to Pasteur the animal will certainly die within eight days, if affected with the disease. All animals bitten by an animal suspected of rabies should be isolated until the period of incubation has past. By this mail I send you a copy of the Physician and Surgeon, for April, 1895, in which I have marked parts bearing on subjects which may be of interest to you. On page 159 you will find facts bearing on the period of incubation in man and in different animals. The period of incubation is variable as you will see.

"In the case of the man who is possibly infected with the disease, I would respectfully ask whether or not the Pasteur treatment has been considered. Authorities seem to think that the treatment (Pastéur) is the only comparatively sure treatment. Generally the subject of treatment is not mentioned by this Board; but in such cases as this it would seem possible that a life might be saved, and I respectfully submit facts for your consideration. In cases where the patient is not able to secure the Pasteur treatment, subscription papers have been passed around. That is the custom in England and Scotland. Only recently in Ohio some eleven persons were sent to a Pasteur Institute at the public expense.

"I shall be glad to hear from you on the subject of the outbreak. Just how many dogs or other animals have developed the disease, how many animals have been bitten, whether or not the animal biting the man is strongly suspected, or proved, to have been rabid, just what is being done to restrict the disease, and any other facts you may have which may be of use to this Office. Is the outbreak confined to your township? If not, in what other townships have the affected animals passed, and have dogs in other townships been bitten to your knowledge? I shall be glad to have any facts in addition to your letter which will enable this Office to aid other localities in preventing or restricting an outbreak of rabies."

May 21, Dr. Godfrey again wrote to Secretary Baker as follows:—

"Relating to the outbreak of rabies, I will state that thus far only two dogs have developed rabies and both were promptly shot—however not until they had each bitten several dogs, which were also shot. There have been quite a number of dogs shot in this vicinity. So far as I can learn the outbreak is confined to this township. The man who was bitten was taken to the county house. I have been informed the authorities there were making arrangements to take him to the Pasteur Institute at Chicago. I send herewith a copy of a notice which has been posted quite freely throughout the township. We have contemplated extending the time through the hot weather during June, July, and August as it is possible dogs were bitten of which we have no knowledge. The first dog developing rabies was a strange dog. We have no idea as to where it came from. It first appeared here during the night preceding the day on which it was shot (May 9th). Please accept thanks for Journal received."

May 25, Secretary Baker again replied to Dr. Godfrey as follows:—

"Please accept cordial thanks for your information relative to the outbreak of rabies.

"You stated in your letter that you had sent a copy of the notice that has been posted in the township. The notice has not reached me. I shall be glad to have it; and, if you have plenty, I shall be glad to have a number that I may supply a copy to other boards as the occasion demands."

June 17, Dr. Godfrey again wrote Secretary Baker as follows:—

"Rabies has broken out among the cattle of the man who had the rabid dog. One died and one was shot. I have reported to J J. Woodman and placed the balance of the herd under quarantine.

"The man bitten was discharged by the physician at the county house. At present he is in Burr Oak and consequently out of my jurisdiction. I am informed that he is surly and different from the natural. The authorities there have knowledge of the case and will I trust look after it."

Upon the receipt of this letter, June 18, Secretary Baker wrote to C. D. Parsons, M. D., health officer of Burr Oak village, as follows:—

"I am informed that a man from the county house of Hillsdale Co., who had been bitten by a dog undoubtedly mad, while at Colon, Michigan, has left the county house and is at present in your village.

"It is alleged that this man does not act naturally, and is surly. I shall be glad to have any fact you may be able to learn, or have in your possession, regarding this man suspected of being infected with rabies.

"Enclosed please find stamped envelope for your reply."

A postscript to the same letter reads:—

"This letter is written with the above-mentioned purpose, also to put you on guard with reference to the danger to others in case this man shall develop a case of rabies."

June 18, Dr. Parsons replied as follows:—

"Yours of this A. M. at hand. In reference to a man that had been bitten by a mad dog. The man had been to the county house and was there 3 weeks when he was allowed to go, as no symptoms of hydrophobia were present. Last week he was taken back to the county house and will be taken care of there until all danger is past. I advised the supervisor to have him detained there several weeks as it is only about 5½ weeks since he was bitten. When I saw him last just before he was taken to county house (4 or 5 days ago) he seemed to be quite rational and as near as I could judge of him no symptoms of rabies. Some nervousness due to apprehension was all.

"If rabies should occur the case will probably be under care of Dr. Robinson of Sturgis as he has charge of county house and he no doubt will report the case to you."

The Secretary's attention being called to an item in the "Williamston Enterprise" of July 17, he wrote to F. W. Robinson, M. D., health officer of the city of Sturgis, on July 19, as follows:—

"'The following item was taken from the Williamston Enterprise, for July 17, 1895:—Benjamin Hill, a Sturgis man, was bitten by a mad dog three weeks ago. During the last week of his life he was strapped in bed to protect his nurse and died in all the agony of Hydrophobia.'

"Herewith I send you a paper on 'Rabies Hydrophobia' which may be of interest to you.

"I shall be glad to have as complete facts relative to this case, as is practicable.

"Was this the same man that was bitten near Colon, Mich., and went to Burr Oak, etc.? Who was his attending physician? Do you know the exact date of his bite and the date of his death? What has become of the animal that caused the bite? Were other persons bitten? Were other animals bitten? Do you know whether the Pasteur anti-rabic preventive inoculations were considered in this case?

"I enclose a stamped envelope for your reply, and shall be glad to have as complete information as practicable regarding this case."

August 8, Dr. Robinson replied as follows:—

"Benjamin Hill was bitten by a dog near Colon, Mich., May 15, and was taken to the St. Joseph Co. poor-house, May 16, and I saw him there the same day. He had been bitten on both hands and his face. The wounds which were many were all superficial except one on his left hand. An attempt had been made to cauterize the wounds by a farmer, for whom Mr. Hill had been working. The wounds had scabbed over when I saw them.

"The dog was killed on the spot and buried. No other person had been bitten. The dog was seen driving some cattle out of the yard and snapping at their heels, but it is thought that none of them were bitten. A few weeks later, however, two of them died, but it is reported that a Veterinary surgeon saw them and said they did not have rabies. As soon as the cattle were reported to have died I urged the county superintendent of the poor to send the man to Chicago to take the Pasteur treatment but before arrangements were made symptoms of rabies appeared.

"The first symptoms appeared June 30th and the man died July 3rd."

REPORTED RABIES IN HOMER TOWNSHIP, MIDLAND COUNTY.

Seeing an item which appeared in the "Midland Republican" of Sept. 6, Secretary Baker wrote to A. L. Bellinger, Supervisor of Homer township, Sept. 11, as follows:—

"There being no health officer reported for your township, I write you concerning the following item which appeared in the Midland Republican for Sept. 6, 1895;—'Mr. Lorimer was bitten by a mad dog Wednesday. Joe Newman suceeded in killing the dog.'

"I would be glad to know whether the newspaper clipping is correct. Were any other persons bitten by the dog? Were there any other animals mad? Did the same dog bite other animals? If so, how many? If the outbreak of rabies extended to any other township or village, I shall be glad to have the facts. I shall be glad to have any facts you may give me, regarding this outbreak. What was the exact date the man was bitten? Who is Mr. Lorimer's attending physician?

"I send you by this mail a copy of the pamphlet on the work of health officers and local boards of health in which I have marked parts bearing upon the duties of the local board. I also send you a copy of a paper on 'Rabies and Hydrophobia.'

"Enclosed please find stamped envelope for your reply."

No reply was received from Mr. Bellinger.

RABIES (HYDROPHOBIA) IN MICHIGAN FOR THE NINE YEARS, 1887-95.

TABLE.—*Exhibiting the numbers of reported outbreaks, definite and suspected cases, and deaths from rabies, in man and animals, in Michigan, during the nine years 1887-95. (Compiled from reports received at the Office of the Secretary of the State Board of Health.)*

Year.	Definite.							Indefinite or suspected.						
		Animals.			Persons.				Animals.			Persons.		
	Outbreaks.	Affected.	Killed.	Died.	Affected.	Died.	Period of Incubation.	Outbreaks.	Affected.	Killed.	Died.	Affected.	Died.	Period of Incubation.
1887	1	1	0	0	1	1	60 days	7	6	1	0	3	1	*8 years.
1888	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1889	6	27	8	14	6	1	† 35 days	2	16	15	0	‡ 1	0	0
1890	2	1	1	0	1	1	§ 20 months	1	2	1	0	0	0	0
1891	3	20	1	7	‖ 6	0	0	0	2	0	2	0	0	0
1892	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1893	7	16	11	0	4	2	* 55 days	1	3	0	0	1	0	0
1894	5	23	20	2	1	1	49 days	5	3	1	1	4	2	0
1895	2	13	13	0	1	1	46 days	1	1	1	0	1	0	0

* 1 Female. † 1 Male. ‡ Treated with a mad stone, result not known to this Office.
§ 1 Case. ‖ 1 Case treated at N. Y. Pasteur Institute, result not known to this Office.

In a paper published in the proceedings of the sanitary convention held under the auspices of this Board at Charlotte Nov. 22 and 23, 1894, Mr. Theo. R. MacClure ably and exhaustively treated the subject of rabies. Reprints of Mr. MacClure's article were made for distribution (Reprint No. 433), copies of which may be had on application to the Secretary of this Board.

GLANDERS IN MICHIGAN IN 1895.

During the year ending Dec. 31, 1895, there were reported to the Secretary of the State Board of Health seven outbreaks of glanders in seven localities. In these outbreaks, nine horses were reported to have been affected by the disease, three of which were killed to prevent the spread of the contagium.

Details of the circumstances attending the said outbreaks of glanders are given in the following extracts from the correspondence of this Office:—

GLANDERS IN CEDAR CREEK TOWNSHIP, WEXFORD COUNTY.

March 4, 1895, Victor F. Huntley, M. D., health officer of Cedar Creek township, reported to this Office the existence of a case of glanders in a horse in his jurisdiction, and asked what his duty was under the circumstances.

In reply to Dr. Huntley's enquiries, the Secretary wrote to him Mar. 23, 1895, as follows:—

"Accept thanks for your report of the suspected case of glanders. You should have also notified Hon. H. H. Hinds, President of the State Live Stock Commission, at Stanton, Michigan. However, in this case I have made and sent a copy of your letter to Mr. Hinds. Glanders is a disease dangerous to man as well as animals, and should be promptly reported to this Office, and restricted by the local board in accordance with Act 137 laws of 1883. Under no circumstances should the local health authorities fail to guard the public health and life from this fearful disease.

"The animal affected with the disease should be thoroughly isolated from all other animals. Any manger, hitching-post, or other article liable to have become infected should be thoroughly disinfected. When practicable it is best to burn such infected things.

"If your local board of health has not existing rules and regulations which will enable it or its health officer to act promptly upon the outbreak of such a disease, I would recommend that, in accordance with section 1639 Howell's Statutes, the local board should adopt and publish a set of rules and regulations in regard to glanders, rabies, etc., which will enable the health officer to act promptly on the appearance of such a disease, and not compel him to wait until the board can meet. Besides publishing such a set of rules, it seems desirable that the local board of health should direct its health officer that on receipt of information that there is within his jurisdiction a case of glanders, etc., he is to immediately give notice to each member of the local board, give public notice of the infected place or places, and take such other steps as he may deem wise for the prompt restriction of the disease.

"Herewith I send you a blank for final report of this outbreak of glanders. When the outbreak is over will you kindly answer the questions on the blank and return it to this Office.

GLANDERS IN BRILEY TOWNSHIP, MONTMORENCY COUNTY.

Jan. 27, 1895, H. P. Macklin, M. D., health officer of Atlanta village, wrote to the Secretary of this Board as follows relative to glanders in Briley township:—

"I have been informed of a couple of cases of glanders in horses in this township; if such is the case or not I am not sure but a veterinary surgeon assured me that it was right. If you will advise one of the deputy veterinarians to see after the case it would be a good idea. If he comes here I will accompany him to the camp where the horses are."

Jan. 29, copy of Dr. Macklin's letter was sent from this Office to the President of the State Live Stock Commission; and a letter of instructions similar to that sent to Dr. Huntley of Cedar Creek township, was sent to Dr. Macklin.

GLANDERS IN BOARDMAN TOWNSHIP, KALKASKA COUNTY.

Feb. 15, 1895, Dr. S. E. Neihart, health officer of Boardman township, Kalkaska county, reported to this Office a case of glanders in a horse in his jurisdiction, and that the animal had been isolated and all precautionary measures necessary to prevent the spread of the disease had been taken. Feb. 22, Dr. Neihart reported that the horse had been killed.

GLANDERS AT BELDING.

April 25, 1895, the Belding Manufacturing Company telephoned to the Secretary of this Board stating that a valuable horse belonging to the company was affected with glanders, and that they desired that the State Veterinarian go to Belding to attend to the matter. The Company also stated that the horse had been isolated and every precaution taken to prevent the spread of the disease.

The Secretary referred the Company to the State Live Stock Commission, and informed them that it was the duty of the local health officer to take charge of the case pending action of the Commission.

On the above-mentioned date, the Secretary, by letter, informed Hon. H. H. Hinds of the facts relative to this case as stated by the Company.

GLANDERS-INFECTED HARNESS IN HANOVER TOWNSHIP, JACKSON COUNTY.

Oct. 2, 1895, Walter C. Snyder, M. D., health officer of Hanover township wrote to the Secretary of this Board as follows:—

"Do you think there would be a possibility of infection from harnesses worn by horses sick with glanders, after said harnesses have been subjected to the fumes of burning sulphur for five hours in a closed stable? One commissioner advised us to bury such harnesses and another instructed us to disinfect them. Which would you advise?"

The Secretary replied to Dr. Snyder's letter as follows:—

"Replying to your letter of Oct. 2, relative to an efficient disinfection of a harness probably infected with glanders, I would not trust to the sulphur fumigation, in a closed stable; but would either burn it, or disinfect by immersion for a short time in a solution of bichloride of mercury one part to 500 of water."

GLANDERS IN TITTABAWASSEE TOWNSHIP, SAGINAW COUNTY.

May 11, 1895, W. B. Cubbage, M. D., health officer of Tittabawassee township, wrote to the Secretary of this Board as follows:—

"I have a valuable mare I fear has farcy or glanders (acute), could you send State Veterinary Surgeon to investigate? Could you authorize Dr. D. G. Sutherland of Saginaw to examine and report?"

May 13, Dr. Cubbage was informed from this Office that he should address his requests for investigation, etc., to the State Live Stock Commission;

and that the diseased animal should be kept isolated until taken in charge by that Commission.

GLANDERS IN MONITOR TOWNSHIP, BAY COUNTY.

Oct. 28, 1895, P. J. McGrath, health officer of Monitor township, telegraphed to the Secretary of this Board as follows:—

"Send State Veterinary Surgeon. Horse here with glanders."

The Secretary replied by telegraph—"Have no power over State Veterinarian. Will notify Live Stock Commission." At the same time the Secretary telegraphed to Hon. H. H. Hinds as follows:—"Health officer of Kawkawlin reports glandered horse. Wants State Veterinarian."

GLANDERS IN WILCOX TOWNSHIP, NEWAYGO COUNTY.

Dec. 21, 1895, W. A. Kuhn, M. D., health officer of Wilcox township, wrote to the Secretary of this Board stating that there existed a case of glanders in a horse in his jurisdiction, and asked what his duty was in regard to it.

Dec. 23, the Secretary wrote to Dr. Kuhn giving him the information asked for.

Jan. 6, 1896, Dr. Kuhn made a final report of this outbreak, in which he stated, substantially, that there had been two horses affected in this outbreak both of which were killed Dec. 24, 1895, and that everything infected had been disinfected and all precautions taken to prevent the spread of the disease.

ACTINOMYCOSIS (LUMP-JAW) IN MICHIGAN IN 1895.

During the year ending December 31, 1895, three outbreaks of (in two instances, supposed) Lump-Jaw were reported to the Office of the Secretary of the State Board of Health. The localities from which the presence of the disease was reported are: Attica, Lapeer Co.; Commerce township, Oakland Co.; and (in or near) Adrian city, Lenawee county.

The correspondence relative to these outbreaks is as follows:—

OUTBREAK OF (SUPPOSED) LUMP-JAW NEAR ATTICA, LAPEER CO.

January 16, Charles J. Manning, a citizen of Attica, Lapeer Co., wrote the Secretary of this Board as follows:—

> "There was a gentleman around Attica buying beef for the asylum at Pontiac, and he bought a cow with a bad swelling on her face, which had been there for some time.
>
> "I should like to know if they have any right to feed such beef to the patients. I am interested there as I have a friend there."

January 18, Secretary Baker wrote to E. A. Christian, M. D., Medical Superintendent of the Eastern Michigan Asylum at Pontiac, quoting Mr. Manning's letter and continued as follows:—

> "From his description I infer that the trouble may have been Actinomycosis (Lump-jaw). This may be communicated to man if the germs of it are not thoroughly cooked."

OUTBREAK OF LUMP-JAW IN COMMERCE TP. OAKLAND CO.

April 29, E. A. Chapman, M. D., health officer of Commerce Tp., Oakland Co., wrote to the Secretary of this Board as follows:—

"Our township Board of Health has been called upon to take some action in a matter pertaining to diseased cow in our township. The disease said to be, by a veterinary surgeon, Lump-jaw. I write you to ascertain what duties the township Board have in such a case or what duties the State may have. Waiting your reply I remain."

May 1, Secretary Baker replied to Dr. Chapman as follows:—

"Accept thanks for your letter of April 29, relative to actinomycosis in a cow, in the township of Commerce.

"You should also have notified Hon. H. H. Hinds. President of the State Live Stock Commission, Stanton, Michigan. I presume he would consider the advisability of sending the State Veterinarian. By this mail I have transmitted a copy of your letter to Mr. Hinds.

"Whether in man or animal any dangerous contagious disease should be reported to the Office of the State Board of Health, and the local authorities should not fail to guard the public health and life against such a dangerous disease. I understand that the disease is dangerous to man as well as animals, conveyed to man by eating of the diseased meat.

"I send you herewith a copy of the pamphlet on the 'Work of Health Officers and of Local Boards of Health,' in which I have marked portions bearing on the duty of the health officer and of the local board in connection with actinomycosis (lump-jaw) or other disease of animals which is dangerous to man or to other animals. The local board of health should take the case in charge, until relieved by the State Live Stock Commission.

"If your local board of health has not already done so, they should under sections 1636 and 1639 Howell's Statutes make and publish rules which will enable the health officer to act immediately on the occurrence of a case of glanders or other such disease, without having to wait until the Board can meet.

"As the disease is a specific parasitical disease, great care should be taken that it does not spread. I would not believe it *altogether* safe to use the milk from an infected cow.

"Will you kindly give any additional information you may have with regard to this or other cases."

OUTBREAK OF LUMP-JAW IN OR NEAR THE CITY OF ADRIAN, LENAWEE CO.

In a letter to the Secretary of the State Board of Health, dated September 2, 1895, F. E. Andrews, M. D., health officer of the city of Adrian said:—

"I have to report a case of lump-jaw in a cow owned by a man by the name of Putnam. I had a veterinary surgeon examine it yesterday and he confirms my opinion. I have notified the party owning cow not to use the milk and to keep her shut up. What shall I do?"

Sept. 3, 1895. Secretary Baker wrote to Hon. H. H. Hinds, Pres. of the State Live Stock Commission, quoting Dr. Andrews' letter. On the same date Dr. Baker replied to Dr. Andrews as follows:—

"Your letter of Sept. 2, relative to a case of lump-jaw (actinomycosis) is before me, for which please accept thanks.

"You should have also notified Hon. H. H. Hinds, President of the State Live Stock Commission, Stanton, Michigan. I presume he would have considered the advisability of sending the State Veterinarian. By this mail I have transmitted a copy of your letter to Mr. Hinds.

"Whether in man or animal, any dangerous contagions disease should be reported to this Office, and the local authorities should not fail to guard the public health and life against such a dangerous disease. I understand that this disease is dangerous to man as well as animals,—conveyed to man by eating the diseased meat.

"I send you herewith a copy of the pamphlet 'Work of Health Officers and of local boards of health' in which I have marked portions bearing on the duty of the health officer and of the local board of health in connection with actinomycosis (lump-jaw), or other diseases of animals which are dangerous to man and to other animals. The local board of health should take the case in charge, until relieved by the State Live Stock Commission.

"If your local board of health has not already done so, they should, under sections 1636 and 1639 Howell's Statutes, make and publish rules which will enable the health officer to act immediately on the occurrence of a case of glanders or other such disease, without having to wait until the board can meet.

"As actinomycosis is a specific parasitical disease, great care should be taken that it does not spread. I would not believe it altogether safe to use the milk from an infected cow.

"I shall be glad to have any additional information which may come to you on this outbreak."

ALLEGED POISONING BY CHEESE, ICE CREAM, ETC., IN MICHIGAN IN 1895.

During the year ending December 31, 1895, there were reported to the Office of the Secretary of the State Board of Health 9 instances in 9 localities, of sickness from alleged cheese poisoning in Michigan. About 100 cases and one death were reported from these localities; the locality reporting the death was Harbor Springs.

(In 1894, one case was reported to this Office, but upon examination by Dr. Vaughan no toxic quality was found in the sample of cheese said to have produced the sickness. In 1893, 21 cases in 4 outbreaks were reported to this Office.)

Correspondence relative to this subject in 1895 is as follows:—

CHEESE POISONING AT HARBOR SPRINGS VILLAGE, EMMET CO.

February 5, Mr. E. Shay, a resident of Harbor Springs, wrote to the Secretary of this Board concerning a death, which was thought to have been caused by tyrotoxicon poisoning. Mr. Shay's letter is as follows:—

"Capt. I. C. Canby, aged 67, Co. F., 23rd. Ohio, served three years and afflicted with chronic diarrhea during the war and ever since, a bachelor, took a lunch Thursday noon, Feb. 28, consisting of cheese, a sample of which I express to you today, some crackers and milk and dried beef. The milk was old and perceptibly sour. In a short time he felt a pain in his stomach which increased rapidly in intensity and a physician was summoned who gave him warm water and mustard but failed to vomit him; then warm water and salt but with no effect to vomit. Then used charcoal and later injections. The pain grew in intensity and the stomach was greatly extended with gas. At 10 A. M. the following day he died. When embalming him but little gas was found in the lower bowels but the stomach and vicinity was as full as it seemed possible to be. He had what he understood to be some disease of the heart for many years past. He insisted the cheese poisoned him. Had been in usual good health up to the time of this attack. The physicians seemed to think the difficulty was with the heart, although the treatment does not seem to agree with that theory. Much interest is manifested to know if the cheese probably was the active cause. It has been in his possession about three months, and none had been used by him in that length of time. I do not know if it is your official duty to notice such matters, and if I am presuming in sending you this communication I hope you will excuse me. He has no relatives in this State. No autopsy was held. And while no one felt like having a chemical analysis with the expense attending it, as the result be what it may, would only be a satisfaction to his friends, and no legal bearing be had, we concluded to forward it to you, and if consistent with your duty or agreeable to you otherwise we would be pleased to have your opinion in this case."

March 8, Secretary Baker forwarded the sample of cheese to Dr. Victor C. Vaughan, Director of the State Laboratory of Hygiene at Ann Arbor, enclosing a copy of Mr. Shay's letter. Secretary Baker also wrote to Dr. Vaughan, in part, as follows:—"It seems to me that this is possibly a case of cheese poisoning, and that the examination should be made. If you agree with me, please have the examination made, and present the bill at the next meeting." On the same date Secretary Baker wrote to Mr. Shay stating that he had forwarded the cheese and a copy of Mr. Shay's letter to Dr. Vaughan, and that the State Board of Health, unfortunately, had neither appropriation nor opportunity for chemical or biological examinations.

The results of Dr. Vaughan's investigations of this sample of cheese, as well as some others mentioned in this article, are published in a paper entitled: "A Poison-Producing Bacillus found in Ice-cream and Cheese," by Dr. Vaughan and George D. Perkins, Medical-student, reprinted from the Transactions of the Association of American Physicians, 1896. Extracts from this paper are given further on in this article.

CHEESE POISONING AT MCBRIDES VILLAGE, MONTCALM CO.

May 11, D. C. Bell, M. D., health officer of McBrides wrote to the Secretary of this Board as follows:—

> "I have sent by this mail a sample of cheese which had been bought and has been selling here and by appearances seems to be poisonous.
>
> "Yesterday morning a certain family partook of the chese which had just been procured from the store, and both were taken sick about 3 or 4 hours afterward; the one quite severe which was manifested by the following symptoms,—faintness, pain in the region of the stomach and bowels, and uncontrollable vomiting and severe purging with great prostration. The husband was also taken sick but not having partaken of so much was not nearly so sick.
>
> "Please examine and report as soon as possible."

May 13, during illness of Secretary Baker, correspondence clerk T. R. MacClure, forwarded the cheese to Dr. Vaughan, enclosing a copy of Dr. Bell's letter; he wrote in part as follows:—"Doctor Baker directs me to ask you to use your judgment whether or not under the circumstances, an examination of the cheese would be for the public-health interests." On the same date, he also wrote to Dr. Bell thanking him for his letter, and advising him that the sample of cheese and a copy of his letter had been forwarded to Dr. Vaughan. Correspondence clerk MacClure also requested Dr. Bell to write the Office all information obtainable relative to the poisoning.

May 17, Dr. Bell replied to the letter. He gave the names of eight persons who had eaten of the cheese, of whom he said:—two were "dangerously sick;" one failed to "experience any very great unpleasant effects;" and the rest were affected "in different degrees of severity." Continuing he said:—"I am informed that the cheese was purchased in Detroit and made in either Rochester or Syracuse, New York State. I advised the cheese being shipped back to Detroit."

May 18, Secretary Baker transmitted to Dr. Vaughan a copy of Dr. Bell's last letter. He also wrote to Dr. Bell asking him to obtain if possible the names of the manufacturers, wholesale and retail dealers of the cheese, with a view to temporarily stopping its sale, providing it was the cause of the sickness.

As will appear further on in this article the cheese at McBrides was found by Prof. Vaughan to contain a poisonous germ.

CHEESE POISONING AT FENNVILLE, ALLEGAN CO.

May 31, W. H. Andrews, M. D., health officer of Fennville, wrote to the Secretary of this Board as follows:—

"I send you today, by express, a piece of cheese for your inspection. I do not know whether the cheese is poisonous or not. But the circumstances are as follows:—Yesterday quite a number of people in the village ate more or less cheese for dinner. During the afternoon, several of them were taken very sick, with symptoms as follows:—Most violent vomiting and purging. I believe that I ever witnessed, followed by the most unquenchable thirst, with intense burning in the stomach, and in nearly all cases terrible cramping of the legs, and in the back and stomach.

Out of six persons in one family who partook of the cheese, four of the six had all of the above symptoms; though not all of equal severity. One member each of three other families who had eaten of the cheese were handled in the same way. I only saw and treated the four cases in one family, but the other physicians report their cases as being the same. Now I have never seen a case of cheese poisoning before, (if these cases were such) but I know the patient seemed to have the symptoms of violent poison. They are all improving at this time. I would be glad to know your opinion in this matter, and also what the investigation develops in the cheese, if anything. The cheese was made May 10, according to the mark on it. Trusting that I may hear from you in due time, I remain."

June 1, in replying to the letter from Dr. Andrews, Secretary Baker said:—

"I have sent the cheese and a copy of your letter to the State Laboratory of Hygiene, at Ann Arbor, where it is probable that an examination will be made. * * * As soon as I hear from the State Laboratory of Hygiene, I will inform you of the results

"In the meantime, I should advise that the sale of the cheese be discontinued. And the cheese *should be kept* for further examination, for which purpose it may be valuable. The symptoms seem to be those of cheese poisoning, and it would be dangerous to continue the further use of the cheese.

"I shall be glad to know from you how much of the cheese is left, where the cheese is made, and just what has been done to prevent further sickness."

June 4, in response, Dr. Andrews wrote as follows:—

"Yours of June 1st, rec'd. In regard to the cheese referred to, there is about twenty lbs. of it on hand. It is laid away in a box and can be had at any time if wanted. As soon as it was learned that those who were sick had eaten of the cheese, the groceryman who sold it immediately laid it aside where it now is. As the sick ones recovered the excitement abated a good deal, and the people are now waiting to learn the facts in the case. This cheese is known as the Amboy cheese and I think is made somewhere in Ohio. The Olney, Judson Grocer Co., wholesale grocers of Grand Rapids, handle the output of the whole plant as I understand. I looked at several of the cheese boxes, but found only the name of the above firm on them. No other mark except the date upon which the cheese was manufactured. The one that is supposed to have caused the trouble was made May 10, 1895, as I said in my other letter to you. One of the men who was sick—Mr. Levi Hulburt—was very bad indeed. I do not know of seeing anyone worse off in that way, and pull out of it. He yet feels the effects of it in his stomach and the muscles of his legs and back.

"Should you need more of the cheese can supply it. Have you any printed matter giving a digest of the manner in which this poison forms in cheese; whether it is only certain parts of the affected cheese or whether distributed all through it. There are some people here who ate of this same cheese, in moderate quantities, who were not sick. Still I do not consider that this establishes the fact of the cheese being non-poisonous."

Further on in this article is a report by Prof. Vaughan of the State Laboratory of Hygiene saying that the cheese at Fennville contained a poisonous germ.

CHEESE POISONING AT FLINT.

July 30, the "Flint Evening Journal" contained an account of the poisoning by cheese of several persons in the city of Flint. Aug. 1, the Secretary of this Board wrote to N. Bates, M. D., health officer of the city, as follows:—

"The Flint Evening Journal of July 30, contains an account of alleged cheese poisoning in the family of H. F. Phillips, and also Mrs. John Donahue and her mother, Mrs Norwood.

"The item states that the cheese was made in Richfield on May 20, last, and was purchased at a fourth ward store.

"A sample of the cheese should be obtained if possible, and sent to Prof. Victor C. Vaughan, M. D., Director State Laboratory of Hygiene, Ann Arbor, Mich., for analysis. Will you kindly do this, if practicable? If you send it, let Dr Vaughan know the reasons why, etc.

"I shall be glad to hear from you relative to this subject."

August 2, in reply, Dr. Bates said he obtained a sample of the cheese and sent it to Dr. Vaughan. Dr. Bates also obtained from Dr. Buckham, the physician attending the suspected cases, the following statement:—

"July 29, 1895, family of H. F. Phillips. Cheese. Family of six. Four partook of cheese at evening meal; father, mother, adult son, and daughter. Mother and son ate freely, father sparingly, and daughter scarcely more than a taste. In about three hours three of them began vomiting; this continued to increase in severity for about two hours, and at intervals of about fifteen minutes, before I was summoned. Mrs. Phillips' vomiting had become almost continuous retching before they became alarmed and sent for a doctor. Found her almost in collapse; lips and fingers blue; extremities cold; pulse slow; twitching of muscles of arms and limbs; skin clammy. Father and son both pale and weak, but not so serious as to be alarming to them. The daughter who had merely tasted the cheese was not sick; she attributed this to the fact that she had eaten half a lemon before retiring. I left them after about two hours all feeling pretty comfortable."

August 3, Secretary Baker acknowledged receipt of letter and the enclosed statement of Dr. Buckham. He asked Dr. Bates to inform the Office of the result of Dr. Vaughan's analysis. Aug. 10, Dr. Bates advised this Office that as yet no reply had been received from Dr. Vaughan, and requested the Secretary to send some literature on cheese poisoning to William H. Adams, one of the stockholders of the Richfield factory. This request the Secretary immediately complied with.

The cheese at Flint was found to contain a poisonous germ, as is stated further on in this article.

ALLEGED CHEESE POISONING IN RICHFIELD TOWNSHIP, GENESEE CO.

August 17, the "Flint Evening Journal" contained a paragraph setting forth facts concerning an outbreak of cheese poisoning, affecting over twenty persons. August 20, Secretary Baker wrote to Geo. N. Porter, health officer of Richfield Tp., as follows:

"The Flint Evening Journal of Aug. 17, 1895, contains an account of a large Sunday school picnic in Munger's woods in Richfield, and says among the eatables was a quantity of cheese, that several were taken violently ill, and a physician was summoned and that it was discovered it was the cheese which caused the sickness, and that the cheese came from the same factory from which bad cheese has before gone forth.

"I would like to have you give me all the information you can relative to the above subject. Where the cheese was obtained, and where made, and also the date it was made. Also whether any of the cheese was sent to any chemist for examination. If not I trust you will have a piece sent to this office."

August 21, Mr. Porter replied as follows:—

"Yours recd. in regard to the Richfield cheese. In reply will say there was a picnic in Munger's woods in this town and there were a number of people taken sick from eating cheese, and the cheese was made in the Richfield factory the 10th of July this year. I was at the factory August 17, and as far as I could see everything was as it should be. I instructed them to apply to you for a thorough examination. Do not know if they will or not. They have sent a piece of cheese to Prof. Kedzie, at Lansing. If they do not will send you a piece of the cheese if you so request. I also hear that the cheese made July 12 is not good "

August 22, Secretary Baker replied to Mr. Porter thanking him for his letter, and stating that it would be best for him to send the sample of cheese to Dr. Vaughan, Director of the State Laboratory of Hygiene at Ann Arbor, or to Prof. F. S. Kedzie, Lansing, as this Office has no laboratory to make such examinations. Secretary Baker added that he would be pleased to know the result of the examinations, providing a sample of cheese was sent for that purpose.

ALLEGED POISONING BY ICE CREAM AT GALIEN VILLAGE, BERRIEN CO.

June 20, the following item appeared in the Detroit Free Press:—

"Galien, Mich., June 19.—At a party given here last night ice cream was served, and shortly afterwards all were taken ill, some of the cases being serious. The physicians have been kept busy during the day and say the sickness was evidently caused by either the cans or the flavoring that was used."

August 27, in a letter to Dr. C. J. Bulhand, health officer of the village, Secretary Baker quoted the above newspaper item, and continued as follows:—

"Enclosed please find stamped envelope for your reply. I shall be glad to have the particulars in this case of poisoning. Was any examination made of the cream, flavoring, or any of the liquid? If so, by whom was it examined and with what results. How many cases and how many deaths?"

August 31. Dr. Bulhand replied as follows:—

"In regard to your inquiry of the 27th would say, as near as I can find out the facts are as follows:—About 20 partook of the cream, and a majority of them were sick; the sickness working in the form of emesis and catharsis. I prescribed for two or three, and that is the extent of professional services so far as I know. No examination was made. I interviewed the parties who made it, found it was very rich milk, and contained first-class flavor, vanilla. Newspaper exaggeration."

ALLEGED CHEESE POISONING AT UNION CITY, BRANCH CO.

June 21, the "Sturgis Journal" stated:—"The entire family of Mortimer Vosburgh of Union City was poisoned, recently, by eating cheese."

August 27, in a letter of inquiry to Dr. S. B. Frankhauser, health officer of the village, Secretary Baker quoted the above-mentioned newspaper item and continued by saying:—

"I shall be glad to receive from you any information you may be able to give. Was any examination made of the cheese? If so, with what result and by whom was the examination made? How many were poisoned? Were any of the cases fatal? How many? I suppose it is now too late to get a sample of the cheese for examination."

August 28, Dr. Frankhauser replied as follows:

"Yours just received and in answer will say that the Vosburg family were undoubtedly poisoned by cheese, also a family north of the town, but just in a mild way.

"Not any proved fatal, but we labored long and earnestly with the oldest daughter of V—s. There were several other families thought they were made sick by the same. I attempted to get the cheese to send away for examination, but as this happened Saturday, by Monday what remained of the cheese had been disposed of."

ALLEGED CHEESE POISONING AT WYANDOTTE.

Sept. 9, the Detroit Journal contained the following:—

> "Notwithstanding the general demoralization of the residents of Wyandotte through poisoning in eating cheese made from new milk, the merchants there continue to sell cheese and the inhabitants to eat it. Consequently the sick list is constantly being daily added to. Yesterday 23 new cases were reported to Dr. Langlois, the health officer, and some of the victims are really in a serious condition."

September 10, the Secretary of this Board wrote to Dr. W. T. Langlois, health officer of the city, quoting the foregoing newspaper item, and stating that he would be pleased to have as complete information as is obtainable; symptoms regarding the sickness; number of cases and deaths, etc. Continuing the Secretary said:—

> "If your city has not already done so, I would recommend that a sample (about 2 pounds) be sent to the State Laboratory of Hygiene, at Ann Arbor, for examination. The examination would probably be made for your city at cost."

September 11, Dr. Langlois replied as follows:—

> "I am glad to know that you have taken cognizance of the cheese poisoning, and I assure you that if there had been any doubt in my mind as to the nature of the poison I should have communicated with you, but as it was, the infected cheese was in two local groceries. They obtained the cheese from the same wholesale house in Detroit. The sale of cheese from this shipment was immediately ordered stopped by me, and while we had in the neighborhood of 40 cases of sickness in various parts of our city, they were all traced to these stores, and one day's sales. I immediately notified the wholesale house to trace this particular shipment, to also notify the creamery from which they obtained the cheese, under penalty of prosecution. Also ordered the groceries to ship the cheese back to the wholesale house. We have had no fatal cases though some have been very sick.
>
> "No. of cases—40, no deaths, symptoms characteristic of tyrotoxicon poisoning, and all the same, with the exception of 5 or 6 cases from Friday night to Sunday morning. No new cases. I do not consider it necessary to have the cheese examined as the case is too apparent to admit of any doubt. Anything further I will gladly give."

ALLEGED CHEESE POISONING IN THETFORD TOWNSHIP, GENESEE CO.

September 24, the "Flint Daily Globe" stated:—"Reta Cornwell was made very sick last week by eating cheese."

September 28, Secretary Baker wrote to Dr. A. H. Coddington, health officer of Thetford township, quoting the above-mentioned newspaper item and continued by saying that he would like all information obtainable, the manufacturer's and the wholesale and retail dealers' names; the date of manufacture, whether any examination of the cheese was made, if so, by whom, and with what results; and if any of the cheese could be obtained.

Dr. Coddington replied October 7, stating that he had investigated the subject, and had found that four or more persons had been taken sick at this time; they were all in the township of Standish; that the cheese was obtained from the store of John Lecuine, Milford, Tuscola Co. While investigating these cases Dr. Coddington found that there had been ten or twelve cases before this summer, and that the cheese they ate came from the Richfield factory. No examination had been made, and at this late date he did not think any cheese could be obtained. No fatality resulted.

A POISON-PRODUCING BACILLUS FOUND IN ICE-CREAM AND CHEESE.

Not having received information from Dr. Vaughan relative to his analyses of the several samples of cheese sent him during the year, Secretary Baker wrote to him for results of his analyses of the samples of cheese which this Office had knowledge of being forwarded to him. Those particularly mentioned in the letter were sent from Harbor Springs, McBrides, Fennville, and Flint. To this letter Dr. Vaughan replied as follows:—

> "In the samples of cheese from Harbor Springs, McBrides, Fennville and Flint, as well as in some other samples of cheese, I found a germ which is described in the article which I send you by this mail under separate cover. The cheese did not contain tyrotoxicon, but contained the poisons described in this article. You are at liberty to use any part or all of this article as you may see fit."

The article referred to in Dr. Vaughan's letter is rather long for publication in this article, consisting of sixteen octavo pages of type. The article is a reprint from the Transactions of the Association of American Physicians, 1896, and is entitled "A Poison-producing Bacillus found in Ice-cream and Cheese," and is by Dr. V. C. Vaughan and George D. Perkins, Medical-student. Short extracts from said article are here quoted:—

> "History. In August, 1895, we received a glass jar containing a small quantity of ice cream which had poisoned a number of people at a small village in Northern Michigan. In October of the same year Dr. Morris, of Vassar, Michigan, sent to us a small portion of cheese which had caused alarming illness in a number of people of that place. These samples of suspected food were examined by the method which we employ in such cases at the Laboratory of Hygiene of the University of Michigan, and which we have published elsewhere. The poison-producing germ was found to be the same in the two articles of food, a fact which was suggested by the similarity of the symptoms observed and reported by the attending physicians at the two places.
>
> "Symptoms. Some fifty people partook of the cream, and all were more or less seriously affected. The number known to have suffered after eating the cheese was twelve. There were no deaths. The symptoms appeared from three to six hours after the food was eaten. The first evidence of illness consisted of nausea, which in all instances was followed by vomiting Diarrhœa was present in the majority, but not in all. The vomiting was accompanied by sharp pains through the abdomen, and it is stated that in some the pain was partially relieved by strong pressure. The most alarming phenomenon observed by the physicians in attendance was feebleness of the heart's action. The hands and feet grew cold, then the entire body became cool and clammy, and in many the radial pulse was not perceptible. This condition, together with a heavy stupor in some, gave occasion for alarm to the attending physicians, and hypodermic injections of brandy, digitalis, strychnine and nitroglycerin were employed, each physician selecting the stimulant in which he had the most confidence, or taking that which he had at hand. In some, the pupils were said to be dilated, but the evidence on this point is confined to the testimony of one physician. In one instance the patient became wildly delirious, crying out, and attempting to rise from bed. Those who vomited but little and had no diarrhœa fell into a heavy stupor, and it is highly probable that these were in greater jeopardy than any of the others. The early and thorough vomiting doubtlessly was the most potent agent in saving those who had taken the larger quantities of the infected food. As has been stated, the depressing action of the poison on the heart impressed the physicians in attendance so markedly that all mention it, and one who had seen other cases of cheese-poisoning thought that the active agent in this instance must differ from that which had caused the sickness previously observed by him.
>
> "Morphology of the Germ. The infecting organism in the ice-cream and cheese is a bacillus, which grows readily both in aërobic and anaërobic cultures. The form of the bacillus is subject to some variations, dependent upon the medium on which and the conditions under which it is grown. Usually it forms rods the length of which is from two or three times its breadth. Under most conditions the rods are single, but at times an end-to-end growth of from two to four bacilli may be seen. Threads are sometimes formed, and in other instances the coccus-form may be approached, but never reached. Germs taken from an agar-tube, after twenty-four hours' growth in the incubator, give an average length of 1.72 μ and a breadth of 0.86 μ. The formation of spores has not been observed."

Continuing, the authors dwell upon the characteristics of the poison, discussing the following subject:—"*Behavior with staining reagents,*" "*Motility,*" "*Growth on Gelatin,*" "*Growth on Agar,*" "*Growth in Beef-tea,*" "*Growth in Milk,*" "*On Blood-serum,*" "*On Potato,*" "*Growth on other vegetables and fruits,*" "*Growth in Uschinsky's fluid,*" "*Effects of Temperature on Growth,*" "*Effects of Mercuric Chloride,*" "*Effects of Carbolic Acid,*" "*Differentiation from the Bacillus coli-communis.*"

In discussing the Pathogenesis the authors say:—

"This germ is pathogenic to guinea-pigs, rabbits, cats, dogs, mice, and rats. Its virulence is increased by being carried through animals. In one series we employed fifty-one guinea-pigs, inoculating each with a culture made from the preceding animal. In all of this series the inoculations were made intra-abdominally. Of the culture with which we began, one cubic centimetre of a beef-tea growth twenty-four hours old was necessary in order to kill a guinea-pig of from two to three hundred grams within twenty-four hours; while of the cultures made from the animals near the end of the series, one-fiftieth of a cubic centimetre of like growth produced the same result. The decrease in the virulence of the germ when grown on the ordinary culture media is rapid, and the intensified virulence attained in the series referred to above disappeared in the third or fourth generation when grown on gelatin or agar. Milk seems to be the most suitable culture medium. We do not know that the germ multiplies more rapidly in milk than it does in beef-tea, but cultures in the former are more virulent than those in the latter. The suspension of the germ in sterilized milk when the inoculation is made renders its action more certain. One-fiftieth of a cubic centimetre of a beef-tea growth of our intensified germ added to one cubic centimetre of milk and immediately injected into the abdominal cavity of a half-grown guinea-pig invariably caused death within twenty-four hours; while an equal amount of the same culture added to beef-tea and injected into companion animals caused death only after a much longer period, and in some failed wholly to do so.

"The germ taken from the exudate in the abdominal cavity and used directly for the inoculation of another animal is more virulent than if it be carried through a culture medium before the inoculation is made. The number of germs in one cubic centimeter of such a peritoneal exudate was determined in one instance and found to be 34,800,000. One one-hundreth of a cubic centimetre of this fluid injected into the abdominal cavity of a guinea-pig weighing 350 grams caused death within twenty hours, while one-half of this quantity failed to cause any visible effects. It will, therefore, be seen that the number of germs in the most virulent culture necessary to kill a half-grown guinea-pig, when injected intra-abdominally, is somewhere between 348,000 and half that number. Subcutaneously larger amounts of cultures were necessary to cause death."

The authors then discuss their more than 200 different experiments upon guinea-pigs, cats, rabbits, rats, mice, and dogs, upon all of which symptoms of poison manifested themselves, and in nearly all cases death resulted in from 12 to 48 hours.

"The Poisonous Chemical Products. Our attempts to isolate the chemical poison or poisons of this bacillus have not been successful. However, we have ascertained some facts along this line, and these may be worthy of record.

"Certain precautions must be observed by one who attempts to isolate the active, chemical constituents of bacterial cultures. The opportunities for falling into error are many, and the difficulties in the prosecution of the work are often great. We have met with some interesting experiences in this connection. In the first place, we hoped that we had in our new bacillus the generator of tyrotoxicon, and with the idea of determining this we rendered our filtered-milk culture alkeline, shook it with ether, allowed the ether to evaporate spontaneously and injected the residue dissolved in water into animals. The animals thus treated died very speedily, but, recalling the experience that one of us had in his study of tyrotoxicon, we tested the residue from the ether alone, and found this to be most intensely poisonous. The residue from fifty cubic centimetres of this ether injected subcutaneously or intra-abdominally into a guinea-pig of from three to four hundred grams killed the animal within ten minutes. This ether is the product of a German manufacturer of good reputation. The residue from five hundred cubic centimetres of Squibb's ether produced no effect on animals. We found a recently received lot from another German firm, also free from harmful constituents. With these tested ethers the extractions, to be reported later, were made.

"We have observed that some of the animals used in our experiments are very susceptible to the action of alcohol. Special attention must be given to this point in the administration of proteids precipitated from alcohol. These precipitates hold alcohol very persistently when dried in vacuo, and the amount of alcohol thus retained may be sufficiently large to markedly affect rabbits, rats, and guinea-pigs. These proteid precipitates may also, when apparently quite dry, contain enough ether, which we have sometimes used for washing out the alcohol, to affect the animals.

"Hydrogen sulphide, when employed for the purpose of removing mercury, platinum, or other base used as a precipitant in cultures, is driven off with great difficulty, and is a most potent poison to guinea-pigs.

"Milk cultures, on account of their complex composition, are notoriously unsuitable for the isolation of bacterial poison. However, as these cultures of this bacillus are especially virulent, we have employed them, with some exception, to be stated later. Two-litre flasks, each containing one litre of sterilized milk, were inoculated with the germ taken directly from the peritoneal cavity of the guinea-pig. These flasks were kept in the incubator for thirty days. The contents were then filtered through paper. As soon as the pores of the paper were coated with the proteid part of the culture the filtrate became not only perfectly clear, but sterile. Thus the slow filtration through porcelain, practised in our first experiments, became unnecessary. From five to ten cubic centimetres of this filtrate injected into the abdominal cavity of full-grown white rats or half-grown guinea-pigs caused death within less than one hour. These filtered cultures were then distilled in vacuo at a temperature not above 40°, until there remains in the retort not more than one hundred cubic centimetres. The distillate was acid with the pleasant odor of the original culture, and ten cubic centimetres failed to induce any symptoms in rats. Five cubic centimetres of the concentrated fluid in the retort killed rats within from five to ten minutes. This concentrated fluid, which was strongly acid, was shaken twice with double its volume of ether. On spontaneous evaporation the ether left a very small residue, which sometimes contained a few imperfect crystals. The residue injected into a full-grown rat killed it within four minutes. The above experiment was repeated many times, and, although the quantity of poison left on the evaporation was found to be variable, it was never altogether wanting. In some instances the residue from the ether consisted of a few drops of a brownish, oily semifluid. In others the residue was perfectly dry, and when examined under the microscope showed some granular matter mixed with a few imperfect and broken prisms. The removal of the poison from the concentrated fluid is imperfect and incomplete, as was shown by driving off the traces of ether from the fluid by keeping it for days in vacuo at 40°, and then injecting some of it into animals, when death resulted quite as promptly as bsfore the extraction with ether was made. When this method was employed with the Uschinsky culture, the amount of poison left on the evaporation of the ether was much less than that obtained from an equal volume of milk culture. The animals died, but not until several hours after the injection. We have not been able to obtain enough of the poison to enable us to identify it chemically.

"Many other methods of isolation have been attempted, but without success. The distillation was in several instances continued *in vacuo* until only a syrupy residue remained. This residue was extracted with absolute alcohol, which dissolves the poison, the alcoholic extract was evaporated, and this residue again treated with absolute alcohol. This was repeated as many as a dozen times and the alcoholic solution was finally precipitated with platinum chloride. This precipitate was crystallized, but was found to consist of a sodium salt.

"In another experiment, the residue after repeated extractions with alcohol was distilled *in vacuo* at a high temperature. At 130° a clear fluid passed over, but this consisted of glycerin containing only traces of the poison which was demonstrated by its action on animals, while the residue in the retort was found to be inert.

"From the concentrated, filtered culture, when made alkaline with either ammonia or a fixed alkali, the poison is not removed by ether. This distinguishes this poison chemically from tyrotoxicon. Physiologically this poison is distinguished from tyrotoxicon by the more pronounced effect of the former on the heart, in which it resembles muscarin or neurin more closely than it does tyrotoxicon. Anatomically the two are unlike, inasmuch as the product of our bacillus induces marked congestion of the tissues about the point of injection or in the peritoneum when thrown into the abdominal cavity. Moreover, the intestinal constriction which was so universally observed in animals poisoned with tyrotoxicon has not been once seen in our work with this new germ and its poison, although it has been carefully looked for in more than two hundred animals experimented with.

"The poison is not removed from either acid or alkaline solutions with chloroform.

"The following experiment was made in order to determine whether or not our bacillus elaborates a proteid poison or a toxin which is precipitated with the proteids. For this purpose an Uschinsky culture was selected, inasmuch as such a culture contains no proteids save those elaborated by the germ. A litre of an Uschinsky culture forty days old was filtered through porcelain in order to remove the germs. The clear, strongly acid filtrate was allowed to fall, drop by drop, into twice its volume of absolute alcohol. A flocculent, white precipitate fell and formed a thin layer on the bottom of the cylinder. This precipitate was collected on a filter and washed for two days with absolute alcohol. It was then dried between folds of filter paper and rubbed to a powder in an agate mortar. Twenty milligrams of this powder were suspended in water and injected into the abdominal cavity of a guinea-pig The animal showed no effect of the poison at the time, but it died two days later. Post-mortem examination showed the same condition as had been observed after death from inoculation with the bacillus and after death from the poison extracted with ether. The peritoneum was highly congested, the abdominal cavity contained a reddish exudate, and the heart was in diastole and filled with blood. It may be that enough of the same poison, which is extracted with ether, had been carried down mechanically with a non-poisonous proteid, and had not been removed by the repeated washings with alcohol. If this be the case, or if there be two chemically distinct poisons, we are not able to determine at present. The Uschinsky fluid which had been treated with two volumes of absolute alcohol, and from which the alcoholic precipitate had been removed as just stated, was concentrated *in vacuo* and the concentrated fluid was shaken with two volumes of ether, and the residue left on the evaporation of the ether injected into a guinea-pig caused death within four hours. Post-mortem examination showed the condition already discribed as due to the germ and the germ-free cultures.

"By a mistake, in which a germ-free milk culture reduced to about half its volume was placed in a bottle labelled nucleinic acid, ten minims of this fluid were injected subcutaneously into a patient of about one hundred and fifty pounds weight. Within thirty minutes this person began to complain of dizziness. A few minutes later there was free vomiting. A little later the bowels moved freely. The vomiting and purging continued at intervals of a few minutes for four or five hours. Two hours after injection the patient complained of deafness and responded only when the lips were placed near the ear and the words spoken in a loud voice. A little later there was a wild delirium, the patient constantly attempting to get out of bed. Three hours after the injection the patient fell into a comatose condition. The feet and hands were cold and the radial pulse imperceptible. Strychnine was given hypodermically and recovery followed slowly but completely.

"Twelve hours after the injection all alarming symptoms had subsided but it was two days before the patient was able to walk about the room. The next day the action of this fluid on guinea-pigs was carefully and repeatedly tested. The animals selected for this purpose weighed from one hundred and ninety to two hundred grams. Ten minims injected subcutaneously had no visible effects on them. One cubic centimetre induced only a slight and temporary effect. Within from five to ten minutes after such injections the animal retched a few times, but manifested no further symptoms. Two cubic centimetres caused death within from four to eight hours. These facts illustrate the difference in susceptibility to the action of this poison in man and guinea-pigs. Evidently our bacillus elaborates a poison of most potent action in man.

"In our studies of the chemical poison we have evaporated the germ-free cultures *in vacuo* and at a low temperature. It must not be inferred from this that higher temperatures quickly decompose the poison. Cultures heated in open dishes on the water-bath for hours, with the contents of the dish at 80° or 90°, do not lose their toxicity, and even brisk boiling over the naked flame for fifteen minutes is without appreciable effect. This shows that milk containing this poison, even after sterilization by heat, may not be altogether harmless. However, as we have already seen the germ is killed at comparatively a low temperature and by the sterilization of milk the further elaboration of the poison is prevented."

DISEASES AMONG HOGS IN MICHIGAN.

Three instances of fatal diseases among hogs were reported to the Secretary of this Board during the year 1895, from Grand Ledge city, Birmingham village, and Blissfield township, relative to which the following extracts from the correspondence of this Office give details:—

FATAL DISEASE AMONG HOGS AT GRAND LEDGE.

Mar. 5, 1895, Dr. Baker received a telephone message from George Whoiley of Grand Ledge, the import of which was substantially as follows:—

Mr. Whoiley operates a meat market. He recently purchased from farmers and placed in a pen or yard he has, some 40 hogs, about 29 of which have died. He wished to know the cause of the deaths, and that some person go to Grand Ledge and tell him.

Dr. Baker replied that - "Unless the disease was dangerous to human beings, he (Mr. Whoiley) should apply to the State Live Stock Commission, or to Dr. Grange, of Lansing, State Veterinarian, whom he could probably get by telephone at Lansing or at the Agricultural College.

REPORTED DISEASED HOGS IN, OR NEAR, BIRMINGHAM VILLAGE.

An anonymous letter dated Birmingham, Aug. 19, 1895, was received at this Office, which read as follows:—

> "There is a matter here that requires your immediate attention. From what I can learn, A. P——, of this place has been, and is, shipping diseased hogs through the country. His hogs were condemned last year, and after losing 15 out of a drove he shipped the rest of the lot. The health of the people demands an investigation of such cases.

On receipt of the above-quoted letter, the Secretary wrote to the President of the village and President of the board of health of Birmingham, informing him of the *nature* and purport of the letter and asking his attention to the subject.

In reply to the Secretary's letter A. W. Whitehead, President of the Board of Trustees of Birmingham, wrote:—

> " Your favor of the 20th inst. addressed to the President of the Village and President of the Board of Health, is received and I called A. P—— into my office and showed him your letter and frankly asked him about it. Mr. P—— is a man of good standing in the community and I had no hesitation in pursuing this course with him, as I was quite sure he would be honest with me as I had been with him.
>
> " He says that he never had any hogs condemned, either last year or any other year and did not ship diseased hogs at any time. He also informs me that he has not sold any hogs for some time. He admits, however, that he has a number of sick hogs on hand at present and that some have died; but he has a competent veterinarian attending them and he has every reason to suppose that they will soon be well again."

Mr. Whitehead further stated that the diseased animals were in Bloomfield township.

HOG CHOLERA IN LENAWEE COUNTY.

Sept. 23, 1895, R. M. Eccles, M. D., health officer of Blissfield township, wrote to the Secretary of this Board as follows:—

> "We are having a serious epidemic of Hog Cholera in three of the best townships in this county. The Commissioner was here and said he could do nothing but leave each township to care for its own. Our health board would like to know whether or not we can make the State bear the expense necessary to suppress the epidemic. It must be controlled or I fear all the hogs in the county will die. We are taking active measures to control it. Please inform me by return mail whether or not the State will bear expense."

Replying to Dr. Eccles' letter, Sept. 24, the Secretary wrote:—

> "Replying to your letter of Sept. 23, relative to hog cholera, you should have corresponded with the State Live Stock Commission, of which Hon. H H. Hinds, Stanton, Michigan, is president. The State Live Stock Commission has supervision over the live stock, and the president, Mr. Hinds, would be able to answer your question whether the State will bear any of the expense in suppressing the outbreak of hog cholera."

POISONING OF DOGS.

Feb. 27, 1895, E. R. Howe, health officer of the village of McBrides, Montcalm county, wrote to the Secretary of this Board stating that some malicious person had scattered poison throughout the village with the intention of poisoning dogs, and that he considered that action endangered the lives of the inhabitants of the village. Mr. Howe further stated that the parties who distributed the poison were known, and were being prosecuted by the village authorities, and requested the coöperation of the Secretary in the matter.

In reply to Mr. Howe's letter, March 1 the Secretary wrote:—"I do not see how this Office can be of any service to you. If it is a question of the enforcement of the public health laws, that remains with the health officer, Prosecuting Attorney and the supervisor. I suppose your local board of health might make regulations which would prevent the careless distribution of the poison."

SUSPECTED POISONING BY ORANGES.

June 10, 1895, Mr. S. W. LaDu, a resident of the unincorporated village of Coral, Maple Valley township, Montclam county, wrote to the Secretary of this Board as follows:—

> "The oranges in this box are the remainder of a dozen made at one purchase, the balance of which was eaten by five persons, four of whom were taken violently sick with cramps in the stomach, three of whom vomited. The oranges were eaten in the evening and during the night and following morning the sickness occurred. No other food was taken. The four who were affected ate of the soft, light colored oranges. You will please investigate in the interest of public health, as to the healthfulness of the fruit."

Copy of Mr. LaDu's letter and the oranges therein mentioned, were sent by the Secretary to Dr. V. C. Vaughan, Director of the State Laboratory of Hygiene at Ann Arbor, for examination.

Copy of Dr. Vaughan's report after examination of said oranges, is as follows:—

"I beg leave to report as follows on the oranges sent to this laboratory.

"From one of the light colored oranges, the kind Mr. LaDu credits with the production of the ill effects, we made cultures for bacteriological study.

"Both bouillon and plate cultures were made, ærobic and anærobic. These remained sterile without exception.

"The juice and pulp of two of the remaining oranges were squeezed out and after filtration through a coarse cloth, these were given a half-grown cat, using an appropriate stomach tube. The cat vomited possibly one-fourth of the whole amount in a few minutes. This I believe was due to the over distention of the stomach. She certainly kept down about ¾ of the juice of two of the oranges and it produced no apparent ill effect.

"From the failure of the culture and from the negative effect of the juice when given an animal we feel confident that the oranges sent here would not have produced the symptoms described in Mr. LaDu's letter.

"In the opinion of the writer, the nature of the juice of the orange is such, that even when rotting it cannot produce any considerable poisonous effect.

"Of course there is always the possibility of poison being placed in the fruit."

SUMMARY OF FACTS RELATING TO THE DANGEROUS COMMUNICABLE DISEASES, IN MICHIGAN IN 1895 AND PRECEDING YEARS.

On pages 148 and 149 of this Annual Report, reference is made to the aims of this Board in collecting and publishing statistics relative to the dangerous communicable diseases in Michigan.

In furtherance of the aims there mentioned, the Secretary of this Board has, for a number of years, caused all reports to this Office from health officers and other reliable sources, relative to dangerous communicable diseases, to be analyzed, the information contained in them classified each year, and the results published under appropriate heads, in the Annual Reports of the Board.

In the following pages is summarized information thus collected through several years, relative to some of the most important diseases; and it is presented in concise form for the information of the public generally, and for the use of those specially interested in the statistical study of the communicable diseases and the progress made in controlling and preventing them in Michigan.

PREVALENCE OF THE DANGEROUS COMMUNICABLE DISEASES IN MICHIGAN.

General Prevalence.

Table 1 exhibits the annual average numbers of cases of sickness and deaths reported to this Office as having occurred in the State from those diseases during the specified periods; also the ratios those averages bear to the annual average population of the State for the same periods.

The accompanying diagram exhibits the annual average sickness rates and death rates from each specified disease per 10,000 of the annual average population.

Table 1, exhibits also that, according to the reports received, measles, scarlet fever, diphtheria, whooping-cough, typhoid fever, consumption* and small-pox caused *sickness* in Michigan during the periods specified in the order named, the disease from which the most sickness was reported being named first; and that consumption, diphtheria, typhoid fever, scarlet fever, measles, whooping-cough and small-pox caused *deaths* in the order given, the disease from which the most deaths was reported being named first.

The order of greatest fatality, *i. e.*, the per cent of all cases which proved fatal, was as follows:—Consumption*, 76.9; diphtheria, 22.7; small-pox, 21; typhoid fever, 16.7; scarlet fever, 5.8; and measles, 1.1 per cent of reported cases.

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* It is reasonably certain that not nearly all the cases of sickness from consumption which occurred in the State were reported to this Office.

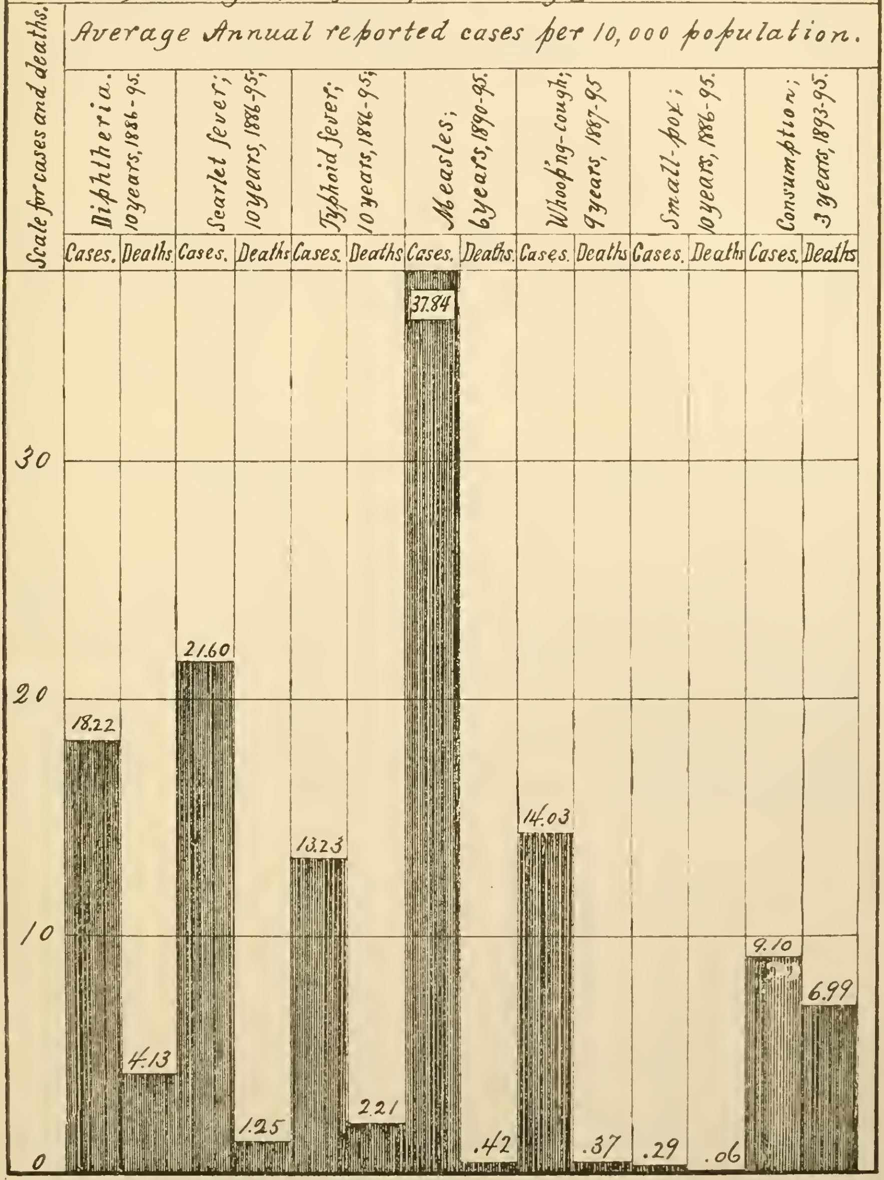


Diagram I.—Exhibiting the average annual numbers of cases of sickness and deaths, per 10,000 average annual population, which were reported as having occurred in Michigan from the different dangerous communicable diseases, during specified periods of years.

[PLATE 893]

TABLE 1.—*Exhibiting for the several Dangerous Communicable Diseases for specified periods of years, the Average Annual Numbers of Reported cases of Sickness and Deaths which occurred in Michigan; also the Average Annual Sickness rates and Death rates per 10,000 Inhabitants from those Diseases for the given Periods of Years.*

Diseases.	Number of years over which each period extends.	Average Annual for each Period.				
		Estimated population.	Reported.		Per 10,000 population	
			Cases.	Deaths.	Cases.	Deaths.
Diphtheria	10 yrs. 1886-95	2,109,258	3,844	872	18.22	4.13
Scarlet Fever	" "	"	4,557	263	21.60	1.25
Typhoid Fever	" "	"	2,791	467	13.23	2.21
Measles	6 yrs. 1890-95	2,186,234	8,273	92	37.84	.42
Whooping-cough	9 yrs. 1887-95	2,128,760	2,987	79	14.03	.37
Small-pox	10 yrs. 1886-95	2,109,258	62	13	.29	.06
Consumption	3 yrs. 1893-95	2,241,641	2,039	1,568	9.10	6.99

Geographical Prevalence (Distribution) of Diphtheria, Scarlet Fever, Typhoid Fever and Measles in Michigan.

The tables 2, 3, 4 and 5 and accompanying maps, exhibit the distribution of diphtheria, scarlet fever, typhoid fever and measles reported throughout the State during certain periods of years, and thereby to facilitate the study of the geographical prevalence of those diseases, and their comparative prevalence in the different counties of the State.

The tables and maps exhibit, for each county, and for specified periods of years, the *average annual* population, the *average annual* numbers of reported cases and deaths from each disease, and the ratio those cases of sickness and deaths bear to the annual average population of the counties in which they occurred.

TABLE 2.—*Exhibiting the Annual Average Population, the Annual Average Numbers of Cases of Sickness and Deaths reported from* **Diphtheria**, *and the Annual Average Reported Numbers of Cases and Deaths per 10,000 persons living in each county in Michigan during the ten years, 1886–95. (Compiled from reports of health officers, clerks, etc.)*

Counties.	Av. annual population for 1886-1895.	Annual average number of reported		Annual average number per 10,000 population, of reported		Counties.	Av. annual population for 1886-1895.	Annual average number of reported		Annual average number per 10,000 population, of reported	
		Cases.	Deaths.	Cases.	Deaths.			Cases.	Deaths.	Cases.	Deaths.
Alcona	5,182	13.1	3.8	25.3	7.3	Lake	6,450	13.7	2.7	21.2	4.2
Alger	1,199	3.5	1.1	29.2	9.2	Lapeer	29,238	42.6	10.4	14.6	3.6
Allegan	38,997	44.2	11.2	11.3	2.9	Leelanaw	8,370	3.5	.9	4.2	1.1
Alpena	15,899	23.0	3.9	14.5	2.5	Lenawee	48,673	33.5	6.7	6.9	1.4
Antrim	10,892	9.9	2.6	9.1	2.4	Livingston	20,819	32.5	5.9	15.8	2.8
Arenac	5,880	35.8	5.9	60.9	10.0	Luce	2,296	3.4	.7	14.8	3.0
Baraga	3,485	.3	0	.9	0	Mackinac	7,164	6.2	1.4	8.7	2.0
Barry	23,805	26.2	5.4	11.0	2.3	Macomb	31,942	46.5	9.0	14.6	2.8
Bay	57,381	171.3	31.2	29.9	5.4	Manistee	24,211	20.4	4.4	8.4	1.8
Benzie	6,155	9.2	1.2	14.9	1.9	Manitou	939	0	0	0	0
Berrien	42,332	44.8	11.6	10.6	2.7	Marquette	36,222	42.6	11 4	11.8	3.1
Branch	26,717	37.9	8.5	14.2	3.2	Mason	16,621	34.9	7.4	21.0	4.5
Calhoun	44,671	43.2	7.6	9.6	1.7	Mecosta	20,234	13.9	4.1	6.9	2.0
Cass	21,078	13.5	2.8	6.4	1.3	Menominee	26,599	66.9	13.5	25.2	5.1
Charlevoix	10,105	4.9	2.4	4.8	2.4	Midland	11,304	43.9	7.8	38.8	6.9
Cheboygan	12,364	50.9	11.7	41.2	9.3	Missaukee	5,486	.5	.2	.9	.4
Chippewa	12,598	18.6	3.7	14.8	2.9	Monroe	32,823	60.3	11.6	18.4	3.5
Clare	7,380	9.3	1.5	12.6	2.0	Montcalm	33,661	18.3	5.5	5.4	1.6
Clinton	26,521	35.1	6.7	13.2	2.5	Montmorency	1,737	7.6	1.4	43.7	8.1
Crawford	2,772	5.3	1.8	19.1	6.5	Muskegon	38,595	87.1	18.6	22.6	4.8
Delta	15,915	5.6	1.5	3.5	.9	Newaygo	19,723	20.9	6.5	10.6	3.3
Dickinson	14,513	51.8	12.2	35.7	8.4	Oakland	41,757	44.7	8.7	10.7	2.1
Eaton	32,242	32.4	6.2	10.0	1.9	Oceana	15,839	18.5	3.2	11.7	2.0
Emmet	9,282	3.6	1.4	3.9	1.5	Ogemaw	5,279	5.5	1.9	10.4	3.6
Genesee	39,742	42.0	7.8	10.6	2.0	Ontonagon	5,184	17.2	2.9	33.2	5.6
Gladwin	4,023	1.6	0	4.0	0	Osceola	15,217	20.8	5.8	13.7	3.8
Gogebic	12,500	13.7	4.2	11.0	3.4	Oscoda	1,779	.2	.1	1.1	.6
G'd Traverse	14,704	18.8	3.9	12.8	2.7	Otsego	4,407	19.7	4.5	44.7	10.2
Gratiot	28,105	11.6	2.9	4.1	1.0	Ottawa	36,899	55.2	11.8	15.0	3.2
Hillsdale	30,686	53.5	6.5	17.4	2.1	Presque Isle	5,042	7.3	2.8	14.5	5.6
Houghton	37,133	47.4	10.2	12 8	2.7	Roscommon	1,985	16.2	3.7	81.6	18.6
Huron	29,267	74.4	16.2	25.4	5.5	Saginaw	80,867	166.0	33.6	20.5	4.2
Ingham	37,970	50.5	11.9	13.3	3.1	Sanilac	32,597	55.5	13.2	17.0	4.0
Ionia	33,518	36.7	7.6	10.9	2.3	Schoolcraft	5,868	7.0	2.7	11.9	4.6
Iosco	13,372	35.8	6.6	26.8	4.9	Shiawassee	31,186	57.3	8.1	18.4	2.6
Iron	4,558	.6	.1	1.3	.2	St. Clair	52,049	87.3	18.7	16.8	3.6
Isabella	19,317	18.1	3.9	9.4	2.0	St. Joseph	25,409	13.0	2.4	5.1	1.0
Jackson	45,629	59.8	14.0	13.1	3.1	Tuscola	32,925	64.5	13.1	19.6	4.0
Kalamazoo	39,651	62.2	12.4	15.7	3.1	Van Buren	30,701	28.9	6.8	9.4	2.2
Kalkaska	5,229	5.7	1.4	10.9	2.7	Washtenaw	42,611	39.4	9.6	9.2	2.3
Kent	110,207	265.0	58.7	24.0	5.3	Wayne	259,011	1038.5	276.1	40.1	10.7
Keweenaw	3,156	8.4	1.8	26.6	5.7	Wexford	12,190	10.6	2.5	8.7	2.1

TABLE 3.—*Exhibiting the annual average population, the annual average numbers of cases of sickness and deaths reported from Scarlet Fever and the annual average reported numbers of cases and deaths per 10,000 persons living in each county in Michigan, during the ten years, 1886–1895. (Compiled from reports of health officers, clerks, etc.)*

Counties.	Annual average population of Michigan for 1886-1895.	Annual average number of reported		Annual average number per 10,000 population, of reported		Counties.	Annual average population of Michigan for 1886-1895.	Annual average number of reported		Annual average number per 10,000 population, of reported	
		Cases.	Deaths	Cases.	Deaths.			Cases.	Deaths.	Cases.	Deaths.
Alcona	5,182	8.7	.6	16.8	1.2	Lake	6,450	22.9	2.6	35.5	4.0
Alger	1,199	7.3	.2	60.9	1.7	Lapeer	29,238	73.6	1.9	25.2	.6
Allegan	38,997	68.9	2.3	17.7	.6	Leelanaw	8,370	4.6	.4	5.5	.5
Alpena	15,899	32.3	3.5	20.3	2.2	Lenawee	48,673	109.0	2.8	22.4	.6
Antrim	10,892	13.4	.7	12.3	.6	Livingston	20,819	47.5	1.1	22.8	.5
Arenac	5,880	3.9	.3	6.6	.5	Luce	2,296	1.8	.2	7.8	.9
Baraga	3,485	1.2	.0	3.4	0	Mackinac	7,164	12.2	2.4	17.0	3.4
Barry	23,805	26.2	1.7	11.0	.7	Macomb	31,942	67.2	2.9	21.0	.9
Bay	57,381	83.4	5.9	14.5	1.0	Manistee	24,211	31.4	3.0	13.0	1.2
Benzie	6,155	13.5	.7	21.9	1.1	Manitou	939	0	0	0	0
Berrien	42,332	64.0	2.9	15.1	.7	Marquette	36,222	122.8	4.7	33.9	1.3
Branch	26,717	53.0	1.6	19.8	.6	Mason	16,621	15.5	1.3	9.3	.8
Calhoun	44,671	68.3	1.2	15.3	.3	Mecosta	20,234	46.6	2.9	23.0	1.4
Cass	21,078	26.5	.9	12.6	.4	Menominee	26,599	36.1	2.8	13.6	1.1
Charlevoix	10,105	33.4	.7	33.1	.7	Midland	11,304	15.5	.2	13.7	.2
Cheboygan	12,364	13.5	1.5	10.9	1.2	Missaukee	5,486	5.1	.7	9.3	1.3
Chippewa	12,598	31.1	3.3	24.7	2.6	Monroe	32,823	35.4	1.2	10.8	.4
Clare	7,380	9.9	.7	13.4	.9	Montcalm	33,661	65.7	3.9	19.5	1.2
Clinton	26,521	48.1	1.9	18.1	.7	Montmorency	1,737	9.8	.3	56.4	1.7
Crawford	2,772	5.6	.9	20.2	3.2	Muskegon	38,595	63.9	3.1	16.6	.8
Delta	15,915	6.6	.5	4.1	.3	Newaygo	19,723	28.1	1.9	14.2	1.0
Dickinson	14,513	33.4	1.8	23.0	1.2	Oakland	41,757	82.7	2.8	19.6	.7
Eaton	32,242	64.6	2.7	20.0	.8	Oceana	15,839	27.0	1.1	17.0	.8
Emmet	9,282	11.4	.6	12.3	.6	Ogemaw	5,279	26.6	.1	50.4	.2
Genesee	39,242	126.2	2.8	31.8	.7	Ontonagon	5,184	4.3	.1	8.3	.2
Gladwin	4,023	2.5	.3	6.2	.7	Osceola	15,217	29.5	2.1	19.4	1.4
Gogebic	12,500	34.8	4.8	27.8	3.8	Oscoda	1,779	.6	.3	3.4	1.7
G'd Traverse	14,704	13.6	.7	9.2	.5	Otsego	4,407	16.8	1.7	38.1	3.9
Gratiot	28,105	25.7	1.5	9.1	.5	Ottawa	36,899	50.4	1.7	13.7	.5
Hillsdale	30,686	59.9	2.4	19.5	.8	Presque Isle	5,042	3.6	0	7.1	0
Houghton	37,133	198.2	13.7	53.4	3.7	Roscommon	1,985	5.5	.1	27.7	.5
Huron	29,267	46.7	2.7	16.0	.9	Saginaw	80,867	101.4	5.3	12.5	.7
Ingham	37,970	59.7	4.3	15.7	1.1	Sanilac	32,597	34.6	2.5	10.6	.8
Ionia	33,518	80.5	1.3	24.0	.4	Schoolcraft	5,868	6.4	.3	10.9	.5
Iosco	13,372	12.1	1.1	9.0	.8	Shiawassee	31,186	87.1	2.4	27.9	.8
Iron	4,558	7.2	.9	15.8	2.0	St. Clair	52,049	118.3	4.1	22.7	.8
Isabella	19,317	36.0	.9	18.6	.5	St. Joseph	25,409	81.4	2.9	32.4	1.1
Jackson	45,629	105.6	3.2	23.1	.7	Tuscola	32,925	59.9	2.0	18.2	.6
Kalamazoo	39,651	104.1	4.2	26.3	1.1	Van Buren	30,701	74.8	4.2	24.4	1.4
Kalkaska	5,229	14.3	.8	27.3	1.5	Washtenaw	42,611	52.3	2.8	12.3	.7
Kent	110,207	288.4	11.0	26.2	1.0	Wayne	259,011	902.5	90.5	34.8	3.5
Keweenaw	3,156	19.9	1.1	63.1	3.5	Wexford	12,190	33.2	2.5	27.2	2.1

TABLE 4.—*Exhibiting the annual average population, the annual average numbers of Cases of sickness and Deaths reported from Typhoid Fever, and the annual average reported numbers of Cases and Deaths per 10,000 persons living in each county in Michigan, during the seven years, 1889–1895. (Compiled from reports of health officers, clerks, etc.)*

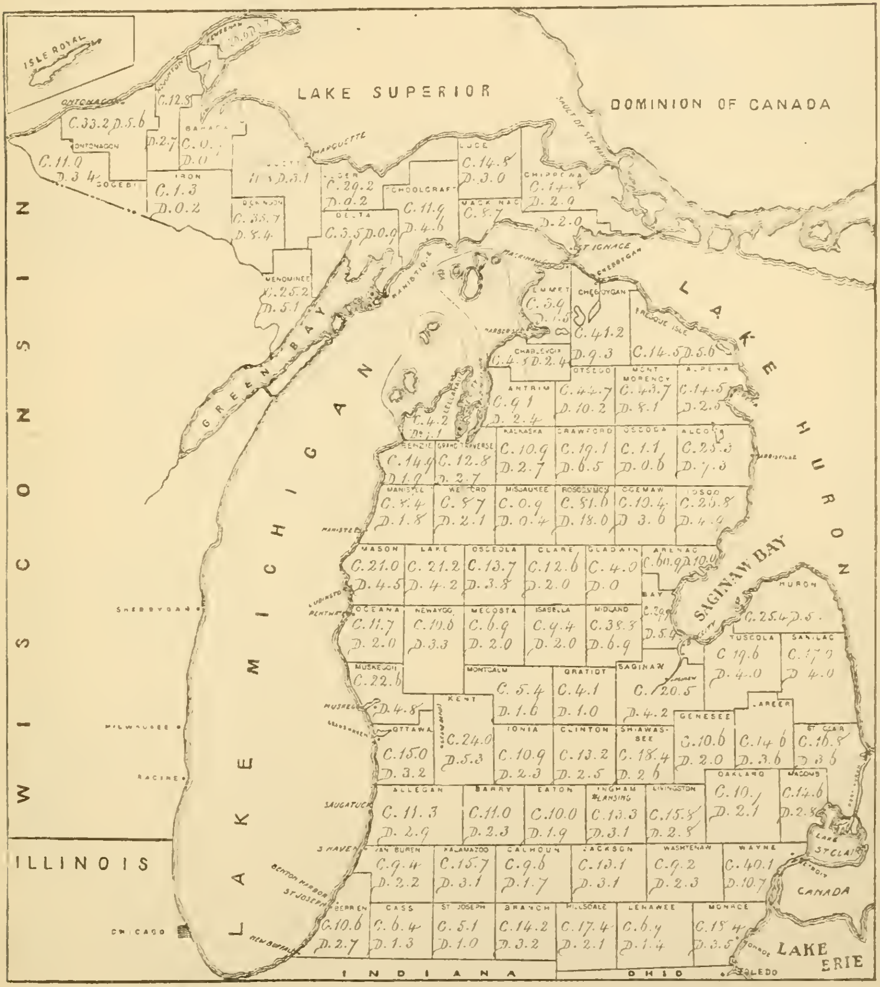
Counties.	Annual average population of Michigan for 1889-1895.	Annual average number of reported.		Annual average number per 10,000 population, of reported		Counties.	Annual average population of Michigan for 1889-1895.	Annual average number of reported		Annual average number per 10,000 population, of reported	
		Cases.	Deaths.	Cases.	Deaths			Cases.	Deaths.	Cases.	Deaths.
Alcona	5,381	4.6	1.7	8.5	3.2	Lake	6,204	6.4	1.1	10.3	1.8
Alger	1,304	0.6	0.1	4.6	0.8	Lapeer	29,065	22.6	4.1	7.8	1.4
Allegan	39,076	29.6	6.7	7.6	1.7	Leelanaw	8,728	10.1	2.6	11.6	3.0
Alpena	16,656	4.1	1.3	2.5	0.8	Lenawee	48,525	63.0	9.3	13.0	1.9
Antrim	11,452	17.6	2.9	15.4	2.5	Livingston	20,650	10.1	0.7	4.9	0.3
Arenac	6,319	5.3	0.1	8.4	0.2	Luce	2,373	6.4	0.1	27.0	0.4
Baraga	3,677	59.7	4.9	162.4	13.3	Mackinac	7,449	2.0	0.0	2.7	0
Barry	23,746	24.9	3.1	10.5	1.3	Macomb	32,108	26.1	4.7	8.1	1.5
Bay	58,909	56.4	19.4	9.6	3.3	Manistee	25,136	20.6	4.9	8.2	1.9
Benzie	6,731	10.3	2.3	15.3	3.4	Manitou	894	0	0	0	0
Berrien	43,532	48.0	13.3	11.0	3.1	Marquette	37,767	275.6	23.9	73.0	6.3
Branch	26,499	49.7	7.7	18.8	2.9	Mason	17,400	17.7	5.7	10.2	3.3
Calhoun	45,583	49.3	8.7	10.8	1.9	Mecosta	20,271	25.4	4.0	12.5	2.0
Cass	21,079	18.6	2.7	8.8	1.3	Menominee	26,076	54.6	10.9	20.9	4.2
Charlevoix	10,373	5.9	1.6	5.7	1.5	Midland	11,984	23.0	3.0	19.2	2.5
Cheboygan	12,963	25.9	3.7	20.0	2.9	Missaukee	6,030	20.7	4.7	34.3	6.8
Chippewa	13,669	67.9	5.9	49.7	4.3	Monroe	32,814	31.1	6.4	9.5	2.0
Clare	7,734	13.0	2.6	16.8	3.4	Montcalm	33,516	23.6	5.7	7.0	1.7
Clinton	26,392	37.9	8.4	14.4	3.2	Montmorency	1,981	0.1	0	0.5	0
Crawford	2,813	0.1	0	.4	0	Muskegon	38,514	24.7	5.3	6.4	1.4
Delta	17,310	15.1	3.9	8.7	2.3	Newaygo	19,717	17.6	4.9	8.9	2.5
Dickinson	14,513	79.0	8.6	54.4	5.9	Oakland	42,008	30.3	5.4	7.2	1.3
Eaton	32,368	26.7	3.9	8.2	1.2	Oceana	16,152	28.3	3.6	17.5	2.2
Emmet	9,682	22.1	4.9	22.8	5.1	Ogemaw	5,566	3.7	0.9	6.6	1.6
Genesee	40,016	25.9	3.9	6.5	1.0	Ontonagon	5,362	9.7	0.4	18.1	0.7
Gladwin	4,515	9.0	1.3	19.9	2.9	Osceola	15,603	9.0	1.7	5.8	1.1
Gogebic	13,432	202.4	11.7	150.7	8.7	Oscoda	1,839	4.0	1.6	21.7	8.7
G'd Traverse	15,553	13.7	2.9	8.8	1.9	Otsego	4,543	10.9	2.7	24.0	5.9
Gratiot	28,640	31.9	4.9	11.1	1.7	Ottawa	37,374	30.1	6.7	8.1	1.8
Hillsdale	30,477	17.9	3.1	5.9	1.0	Presque Isle	5,328	1.1	0.3	2.1	0.6
Houghton	39,862	132.7	11.6	33.3	2.9	Roscommon	1,845	2.4	0.9	13.0	4.9
Huron	30,438	50.7	7.0	16.7	2.3	Saginaw	81,867	55.1	12.9	6.7	1.6
Ingham	38,685	50.1	11.9	13.0	3.1	Sanilac	33,244	55.7	8.7	16.8	2.6
Ionia	33,877	32.3	6.3	9.5	1.9	Schoolcraft	6,456	40.0	1.7	62.0	2.6
Iosco	13,569	12.0	2.7	8.8	2.0	Shiawassee	31,902	49.4	6.9	15.5	2.2
Iron	4,960	14.7	3.1	29.6	6.3	St. Clair	53,165	79.6	13.0	15.0	2.4
Isabella	20,140	24.1	3.9	12.0	1.9	St. Joseph	25,234	22.3	4.3	8.8	1.7
Jackson	45,841	51.7	9.6	11.3	2.1	Tuscola	33,486	33.9	5.7	10.1	1.7
Kalamazoo	40,669	69.4	10.1	17.1	2.5	Van Buren	30,813	38.1	5.7	12.4	1.8
Kalkaska	5,401	8.1	1.3	15.0	2.4	Washtenaw	42,894	14.9	3.3	3.5	0.8
Kent	115,756	298.3	54.1	25.8	4.7	Wayne	274,428	187.1	65.1	6.8	2.4
Keweenaw	2,889	10.6	1.6	36.7	5.5	Wexford	12,743	19.4	4.4	15.2	3.5

TABLE 5.—*Exhibiting the annual average population, the average annual numbers of cases of sickness and deaths reported from Measles, and the annual average reported numbers of cases and deaths per 10,000 persons living in each county in Michigan, during the seven years, 1889–95. (Compiled from reports of health officers, clerks, etc.)*

Counties.	Annual Av. population of Michigan, 1889-95.	Annual average number of reported		Annual average number per 10,000 population, of reported		Counties.	Annual Av. population of Michigan, 1889-95.	Annual average number of reported		Annual average number per 10,000 population, of reported	
		Cases.	Deaths.	Cases.	Deaths.			Cases.	Deaths.	Cases.	Deaths.
State	2,167,322	7,500.1	83.1	34.6	.4	Keweenaw	2,889	28.9	0.6	100.0	2.1
						Lake	6,204	28.7	0	46.3	0
Alcona	5,381	6.4	.1	11.9	.2	Lapeer	29,068	138.6	0	47.7	0
Alger	1,304	.4	0	3.1	0	Leelanaw	8,728	3.6	0	4.1	0
Allegan	39,076	251.3	2.7	64.3	.7	Lenawee	48,525	308.9	2.1	63.7	.4
Alpena	16,656	100.9	1.1	60.6	.7	Livingston	20,650	90.6	.4	43.9	.2
Antrim	11,452	44.3	.4	38.7	.3	Luce	2,373	.3	0	1.3	0
Arenac	6,319	3.0	.1	4.7	.2	Mackinac	7,449	27.1	0	36.4	0
Baraga	3,677	2.6	0	7.1	0	Macomb	32,108	106.4	.4	33.1	.1
Barry	23,746	103.6	.4	43.6	.2	Manistee	25,136	72.4	.1	28.8	.04
Bay	58,909	106.1	1.7	18.0	.3	Manitou	894	----	----	----	----
Benzie	6,731	56.3	.6	83.6	.9	Marquette	37,767	214.6	5.4	56.8	1.4
Berrien	43,532	116.7	2.1	26.8	.5	Mason	17,400	29.1	1.1	16.7	.6
Branch	26,499	138.6	1.1	52.3	.4	Mecosta	20,271	79.9	.7	39.4	.3
Calhoun	45,583	186.6	1.9	40.9	.4	Menominee	26,076	82.0	2.1	31.4	.7
Cass	21,079	47.9	.1	22.7	.05	Midland	11,984	28.1	0	23.4	0
Charlevoix	10,373	47.1	.4	45.4	.4	Missaukee	6,030	21.9	.9	36.3	1.5
Cheboygan	12,963	32.3	.3	24.9	.2	Monroe	32,814	113.4	2.4	34.5	.7
Chippewa	13,669	11.3	.1	8.3	.1	Montcalm	33,516	124.3	1.6	37.1	.5
Clare	7,734	3.0	0	3.9	0	Montmorency	1,981	5.1	0	25.7	0
Clinton	26,392	235.0	1.7	89.0	0.6	Muskegon	38,514	169.9	.9	44.1	.2
Crawford	2,813	3.9	0	13.9	0	Newaygo	19,717	54.3	.7	27.5	.4
Delta	17,310	18.6	2.3	10.7	1.3	Oakland	42,008	153.4	.6	36.5	.1
Dickinson	14,513	47.1	.1	32.5	.1	Oceana	16,152	184.1	1.1	114.0	.7
Eaton	32,368	107.7	.7	33.3	.2	Ogemaw	5,566	5.0	0	9.0	0
Emmet	9,682	6.1	0	6.3	0	Ontonagon	5,362	32.0	.1	59.7	.2
Genesee	40,016	85.0	1.0	21.2	.2	Osceola	15,603	24.4	.3	15.6	.2
Gladwin	4,515	8.0	.1	17.7	.2	Oscoda	1,839	1.4	.3	7.6	.2
Gogebic	13,432	10.7	0	8.0	0	Otsego	4,543	8.6	.1	18.9	.2
Gd. Traverse	15,553	30.9	.1	19.9	.1	Ottawa	37,374	181.6	.4	48.6	.1
Gratiot	28,640	62.7	.3	21.9	.1	Presque Isle	5,328	12.7	.6	23.8	1.1
Hillsdale	30,477	172.4	.4	56.6	.1	Roscommon	1,845	15.3	.1	82.9	.5
Houghton	39,862	117.7	.9	29.5	.2	Saginaw	81,867	198.4	2.1	24.2	.3
Huron	30,438	87.6	2.3	28.8	.8	Sanilac	33,244	130.0	.9	39.1	.3
Ingham	38,685	51.9	2.3	13.4	.6	Schoolcraft	6,456	54.6	.7	84.6	1.1
Ionia	33,877	224.9	1.0	66.4	.3	Shiawassee	31,902	190.0	1.0	59.6	.3
Iosco	13,569	32.1	.3	23.7	.2	St. Clair	53,165	116.9	.4	22.0	.1
Iron	4,960	.7	0	1.4	0	St. Joseph	25,234	78.6	.7	31.1	.3
Isabella	20,140	19.7	.1	9.8	.04	Tuscola	33,486	99.1	.3	29.6	.1
Jackson	45,841	73.4	1.0	16.0	.2	Van Buren	30,813	194.4	.3	63.1	.1
Kalamazoo	40,669	185.7	1.3	45.7	.3	Washtenaw	42,894	173.4	.7	40.4	.2
Kalkaska	5,401	40.3	.3	74.6	.6	Wayne	274,428	93.4	17.9	3.4	.7
Kent	115,756	884.7	4.0	76.4	.3	Wexford	12,743	59.6	1.1	46.8	.9

DISTRIBUTION OF DIPHTHERIA IN MICHIGAN, 10 YEARS, 1886-95.

BY COUNTIES, THE AVERAGE ANNUAL CASES AND DEATHS PER 10,000 INHABITANTS.

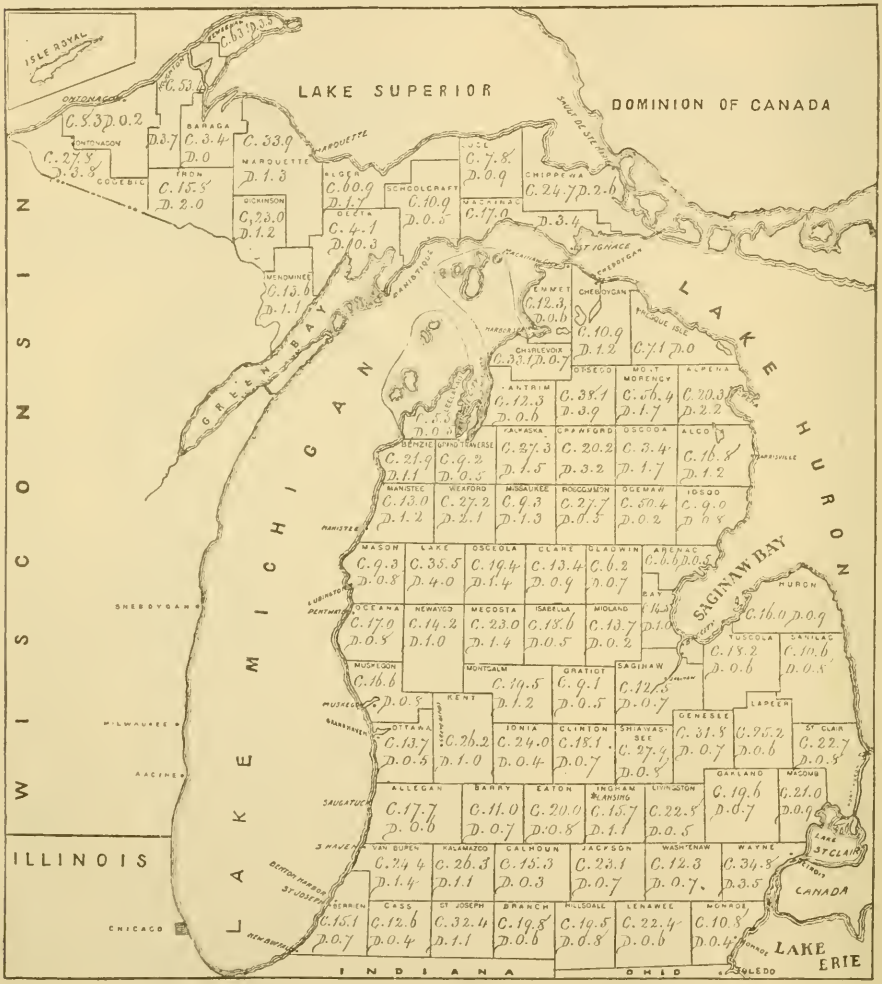


C.= Cases per 10,000 population; D.= Deaths per 10,000 population.

[PLATE 892]

This map graphically represents the last two columns in Table 2, page 407.

DISTRIBUTION OF SCARLET FEVER IN MICHIGAN, 10 YEARS, 1886-95.
BY COUNTIES, THE AVERAGE ANNUAL CASES AND DEATHS PER 10,000 INHABITANTS.

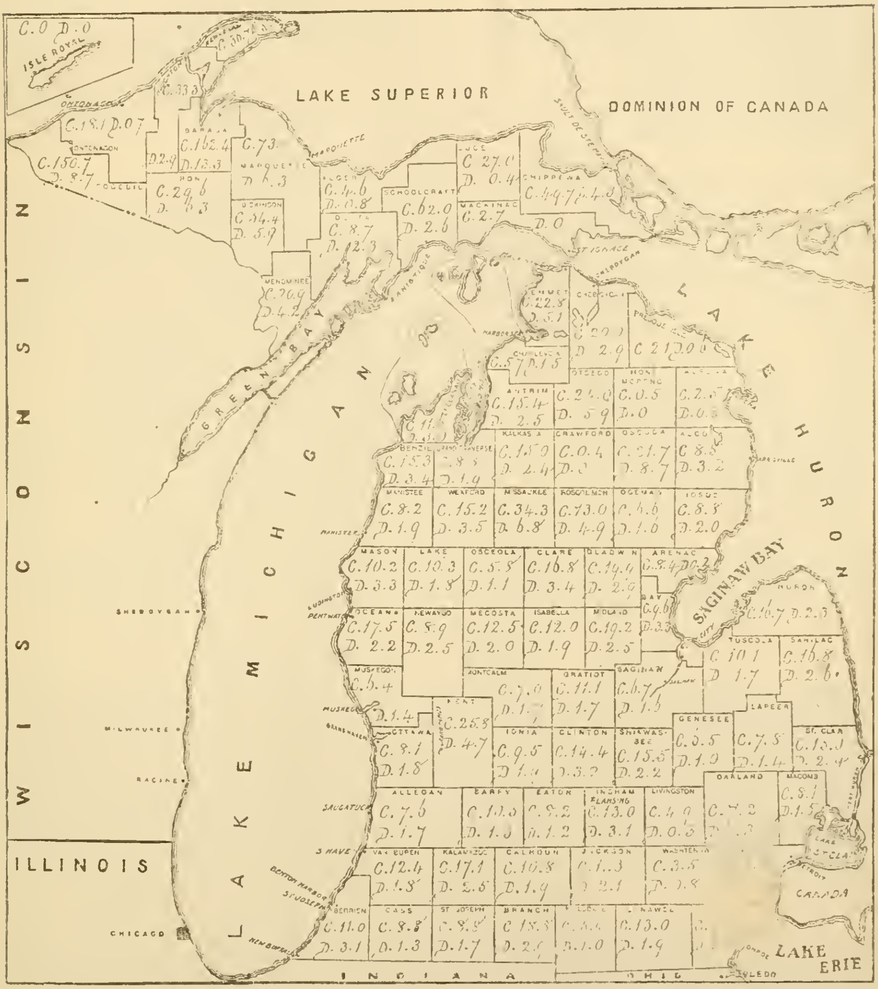


C.= Cases per 10,000 population; D.= Deaths per 10,000 population.

[PLATE 89]

This map graphically represents the last two columns in Table 3, page 408.

DISTRIBUTION OF TYPHOID FEVER IN MICHIGAN, 7 YEARS, 1889-95
BY COUNTIES, THE AVERAGE ANNUAL CASES AND DEATHS PER 10,000 INHABITANTS.

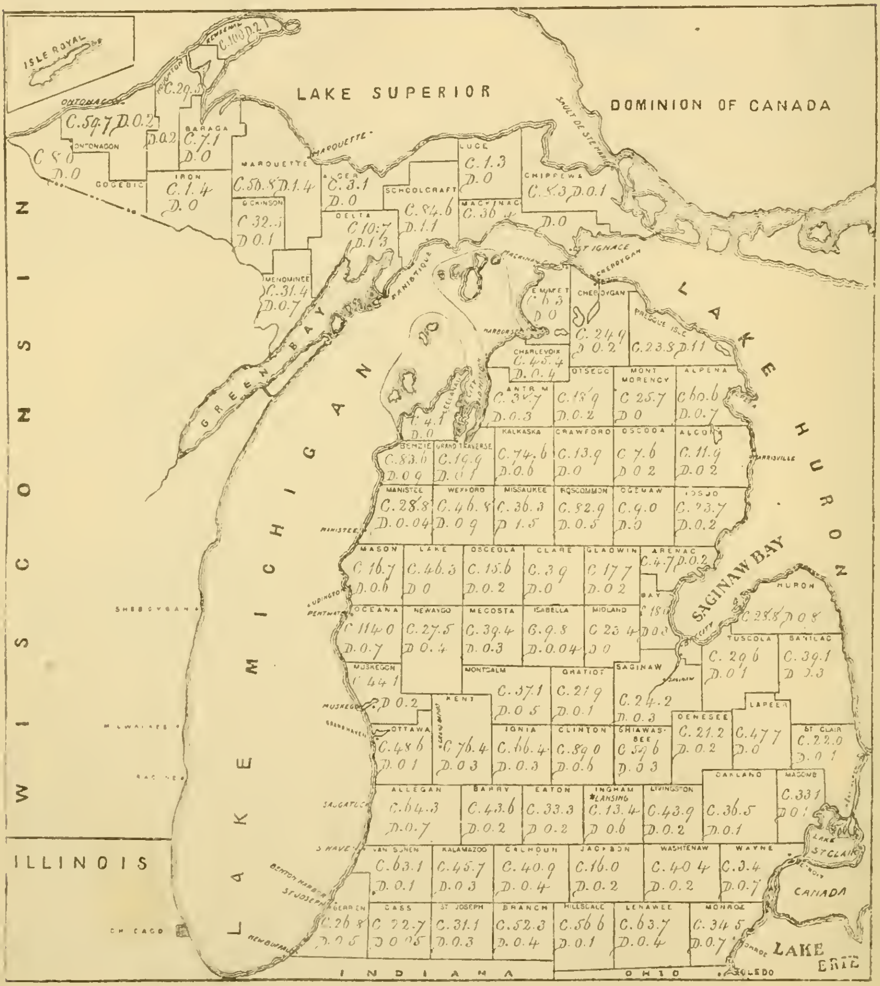


C.= Cases per 10,000 population; D.= Deaths per 10,000 populat.

[PLATE 85C]

This map graphically represents the last two columns in Table 4, page 409.

DISTRIBUTION OF MEASLES IN MICHIGAN, 7 YEARS, 1889–95: BY COUNTIES, THE AVERAGE ANNUAL CASES AND DEATHS PER 10,000 INHABITANTS.



C.= Cases per 10,000 population ; D.= Deaths per 10,000 population.

[PLATE 888]

This map graphically represents the last two columns in Table 5, page 410.

SEASONAL SPREADING OF DIPHTHERIA, SCARLET FEVER, TYPHOID FEVER AND MEASLES.

Table 6 shows the total numbers of reported new outbreaks of diphtheria, scarlet fever, typhoid fever and measles of which the dates of beginning were reported to this office as having occurred during specified periods; and the number of those outbreaks which began in each month of the year. The diagram accompanying table 6, graphically illustrates that table.

Seasonal Spreading of Diphtheria.

From table 6, it appears that of the 3,091 outbreaks of diphtheria reported to this office during the seven years 1889-95, the greatest number (480) began in the month of January, and the least number (172) in July.

Starting from July, the month of minimum incidence, the number of new outbreaks of the disease steadily increases until it reaches the maximum in January, when it begins to decline.

According to the data contained in this table (6), in Michigan the season of greatest danger of diphtheria spreading to new localities is during the months of October to March, i. e., during the season of lowest atmospheric temperature, and comparison of table 6 with temperature tables on pages 4 and 5 of this report shows that the fluctuations in the spread of diphtheria correspond generally with those of atmospheric temperature, the former being in inverse proportion to the latter.

Exhibit XIII., (page 124 of this Report) constructed on a different statistical basis, shows the months of greatest prevalence of diphtheria.

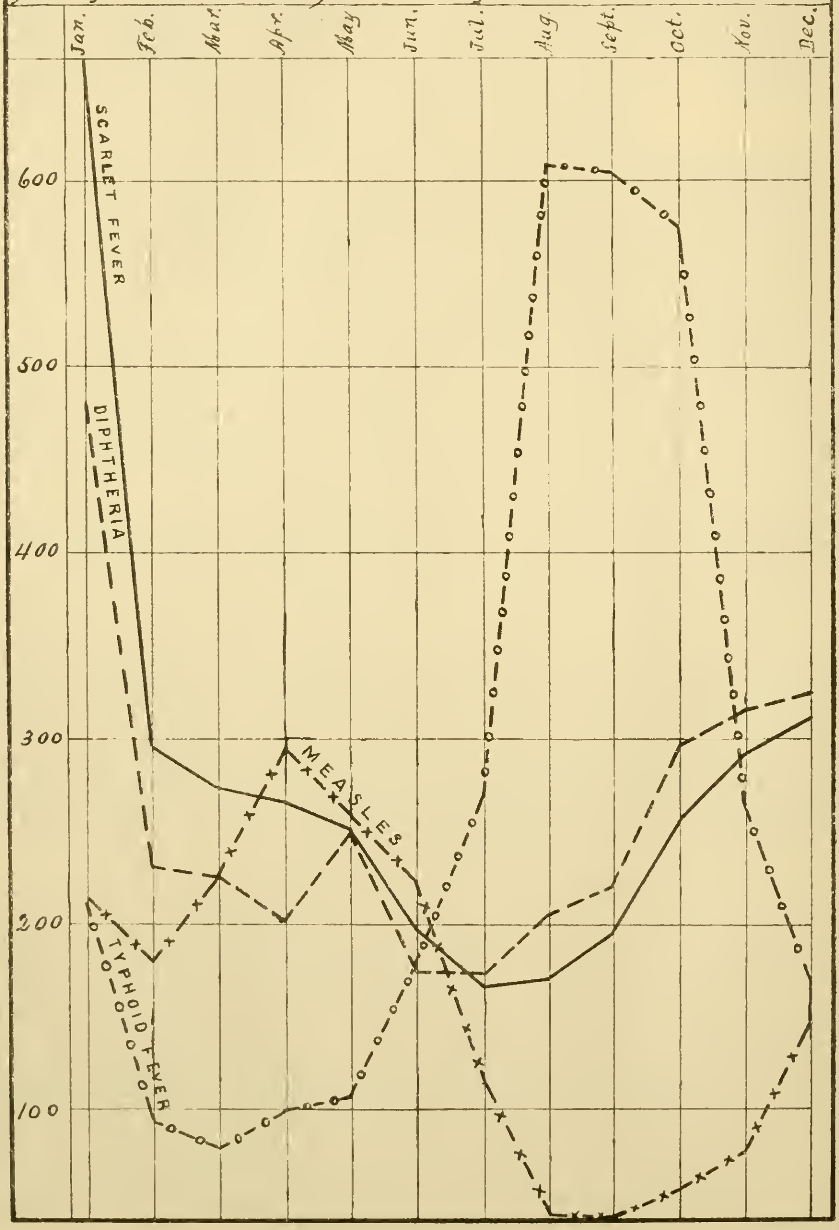
Seasonal Spreading of Scarlet Fever.

Table 6 shows that the seasonal variations in incidence of scarlet fever in Michigan are very similar to those of diphtheria, its maximum spread occurring in January and its minimum spread in July. This indicates that scarlet fever like diphtheria is a "cold weather disease" whose fluctuations in spread generally follow (inversely) those of atmospheric temperature. The "Sickness Statistics" (Exhibit XIII., page 124 of this Report) show slightly different fluctuations of prevalence of scarlet fever from those shown in table 6; but are *generally* similar.

Seasonal Spreading of Typhoid Fever.

According to table 6 the season of greatest spreading of typhoid fever in Michigan is from August to October, and its minimum spread occurs in February to May. These seasons of greatest and least incidence of typhoid fever very closely accord with those of its greatest and least prevalence, shown by the "Statistical Study of Sickness"(Exhibit XX., page 135 of this Report) and indicate that, unlike diphtheria and scarlet fever, the fluctuations in the spread of typhoid fever have no direct relation to those of atmospheric temperature. But comparison of table 6 with table 16 on page 327 of this Report, shows that there exist very close relations between the fluctuations of incidence of typhoid fever and the amount of ground water in wells; the spread of typhoid fever increasing in proportion to the decrease of the ground water.

Diagram.— Exhibiting, for diphtheria, typhoid fever and measles, for the 7 years 1889-95, and for scarlet fever for the 6 years 1889 and 1891-95, the actual and the relative numbers of reported outbreaks (of which the beginnings were stated) which began in each month.



[PLATE 894]

Seasonal Spreading of Measles.

From table 6 it appears that the season of greatest spreading of measles in Michigan, begins in March, reaching its maximum in April and extending through May and June, gradually declining until it reaches its minimum in August and September.

TABLE 6.—*Exhibiting the total numbers of outbreaks of Diphtheria, Scarlet Fever, Typhoid Fever and Measles reported to the Michigan State Board of Health during certain specified periods, of which reporters gave the dates of beginning; also the numbers of those outbreaks which began in each month.*

Disease.	Periods of Years.	Totals.	Jan.	Feb.	Mar.	Apr.	May.	Jun.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Diphtheria	7 years, 1889-95.	3,091	480	229	225	202	248	173	172	205	220	297	316	324
Scarlet Fever	6 years, 1889 and 1891-95.	3,335	666	294	272	266	249	198	166	170	195	256	291	312
Typhoid Fever	7 years, 1889-95.	3,257	212	93	78	99	107	178	269	609	605	574	265	168
Measles	7 years, 1889-95.	1,870	214	179	224	295	258	223	113	42	41	57	77	147

REPORTED SOURCES OF CONTAGIUM OF DIPHTHERIA, SCARLET FEVER, TYPHOID FEVER AND MEASLES IN MICHIGAN.

In the Annual Reports of this Board for a number of years past, tables have been published showing for each of the four above-named diseases, the reported sources of contagium in outbreaks of those diseases. The said tables are based on reports from health officers who reported that they believed they were able, or not able, to trace the source of contagium of outbreaks of said diseases which occurred in their jurisdictions. Table 7 is a summary of such tables, and shows the reported sources of contagium of the various diseases mentioned therein, for the nine years 1887–95.

From Table 7 it may be seen that of the 93,478 cases of the four diseases there considered, the source of the contagium in 29,380 cases was reported as unknown, and in 40,802 cases no source of contagium was stated. Of the remaining 23,296 cases 13,409 were definitely, and 1,193 probably, traced to former cases of the diseases; 1,646 cases were traced definitely and 47 probably to contagium brought from outside the jurisdictions of the health officers reporting; in 5,013 cases the contagium was said to be from contaminated water; 13 cases from contaminated milk; and 1,975 cases were attributed to various other sources.

TABLE 7.—*Exhibiting for the nine years 1887–95, the reported sources of contagium of diphtheria, scarlet fever, typhoid fever and measles in Michigan.*

Diseases.	Traced to former cases.		Traced to outside jurisdictions.		Infection from					Low water in wells.	Unknown, etc.	Not stated.	Totals.
					Contaminated		"Old clothing," etc.	Unsanitary conditions, defective drainage, etc.	Exposure.				
	Definitely.	Probably.	Definitely.	Probably.	Water.	Milk.							
Diphtheria	3,576	172	99	9	49	----	61	903	----	----	7,434	10,564	22,869
Scarlet Fever	4,727	600	78	38	------	----	57	76	----	----	8,892	10,317	24,785
Typhoid Fever	1,061	56	1,005	------	*4,964	†13	----	757	----	16	3,355	7,511	18,736
Measles	4,045	365	464	------	------	----	----	--------	105	----	9,699	12,410	27,088
Totals	13,409	1,193	1,646	47	5,013	13	118	1,736	105	16	29,380	40,802	93,478

* Includes 52 cases *probably* traced to contaminated water.
† Includes 1 case traced to infected food.

PERIOD OF INCUBATION OF DIPHTHERIA, SCARLET FEVER AND MEASLES IN MICHIGAN.

The three tables (8, 9, 10) exhibit for the three diseases above named, during specified periods of years, the average periods of incubation reported by health officers of the State to the Secretary of the State Board of Health. Each of the tables is divided into two parts. The first part treats of instances relative to which the reports stated the period of incubation to have been a *definite* number of days. The second part relates to instances of which reporters stated the periods of incubation as *within certain limits of days*, as, for example, 5 to 10 days.

From table 8 it may be seen that in the 786 instances in which the period in diphtheria was reported in definite numbers of days during the nine years 1887–95, the average duration was 8.1 days; and in the 245 instances where the reports stated the periods within limits of days the average period was 7.1 days.

Table 9 shows that in 750 instances of scarlet fever reported during the nine years 1887–95 where the period of incubation was given in definite numbers of days, the average duration was 8.5 days; and that in the 264 instances where it was stated as within limits of days, the average period was 8.4 days.

Table 10 shows that for measles during the three years 1893–5, there were 257 instances reported in definite numbers of days with an average of 11.6 days and 124 instances within limits of days with an average of 12.5 days.

TABLE 8.—*Exhibiting for the nine years, 1887–95, the average period of incubation in cases of Diphtheria in Michigan.* (*Compiled from reports of health officers to the State Board of Health.*)

Year.	Instances.	Average Period of Incubation in days.	Incubation-periods in Days—Number of Instances under each Day.																																		Incubation—period in certain limits of days.	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	43	46	Instances.	Average period in days.
1887...	35	7.3	....	1	9	2	4	3	6	1	....	1	1	1	1	2	1	....	....	....	..	1	1	..	..	..	..	..	.	.	..	..	..	..	..	..	20	7.6
1888...	30	9.3	....	1	....	3	2	1	7	6	3	1	....	....	....	2	....	....	....	2	..	..	1	..	..	..	..	..	..	.	..	1	.	..	..	..	14	8.9
1889...	139	6.9	12	7	7	18	....	8	17	43	...	9	....	2	10	5	1		....	....	..	..	..	..	..	..	..	..		..	..	..	..	..	..	..	20	6.0
1890...	78	7.7	1	13	3	10	2	6	13	2	..	7	2	8	...	8	....	....	....	...	..	1	1		..	..	..	..	..	1	..	..	..	..	..	.	11	7.3
1891...	104	7.4	1	8	10	7	11	4	19	6	15	8	..	2	1	8	3	....	....	....	..	..	1	..	..	..	..	..	..	..	..	..	..	..	..	..	14	7.9
1892...	95	6.5	1	15	6	7	22	8	12	4	3	2	.	2	1	6	5	..	...	....	..	..	..	..	..	..	1	..	..	..	..	..	..	..	..	..	29	5.5
1893...	72	7.9	....	8	1	8	11	2	11	11	3	2	2	1	..	3	2	....	3	2	..	..	1	..	.	1	..	..	..	..	..	..	..	..	..	..	27	7.7
1894...	110	11.0	....	2	1	7	7	7	24	6	12	7	1	2	..	16	2	3	..	...	.	1	..	1	..	4	..	..	..	3	1	..	..	1	1	1	51	6.5
1895...	123	9.0	1	5	6	22	10	5	15	9	8	10	2	4	3	12	...	...	..	.	1	1	3	.	.			.		2	..	4	.	.	.	..	59	6.5
Totals.	786	8.1	16	60	43	84	69	44	124	88	44	47	8	22	16	62	14	3	3	4	1	4	8	1	..	5	1	..	..	6	1	5	..	1	1	1	245	7.1

TABLE 9.—*Exhibiting for the nine years 1887–95, the average period of incubation in cases of Scarlet Fever in Michigan.* (*Compiled from reports of health officers to the State Board of Health.*)

Year.	Instances.	Average Periods of Incubation, in days.	Incubation-period in Days—Number of Instances under each Day.																																	Incubation—period in certain limits of days.	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	35	42	56	Instances.	Average period in days.
1887	23	8.0	----	----	6	----	2	2	5	2	1	2	----	----	----	1	----	----	----	----	--	1	--	--	--	--	--	--	--	--	--	1	--	--	--	18	7.8
1888	39	8.1	----	4	----	----	6	1	8	----	7	7	3	----	1	1	----	----	----	----	--	--	1	--	--	--	--	--	--	--	--	--	--	--	--	12	8.6
1889	31	7.0	----	1	1	5	3	2	7	5	2	3	----	----	1	1	----	----	----	----	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	13	6.8
1890	77	8.8	3	3	4	1	4	4	20	11	4	5	2	1	----	9	1	----	----	----	--	--	2	1	--	--	--	--	--	1	--	1	--	--	--	21	8.4
1891	57	9.1	---	3	3	2	5	5	9	2	10	3	1	1	1	5	1	1	----	----	--	3	1	--	1	--	--	--	--	--	--	--	--	--	--	12	8.8
1892	69	8.6	----	3	3	7	6	6	11	8	4	3	2	4	1	6	1	1	----	----	--	--	1	--	--	--	--	1	--	--	--	--	1	--	--	21	8.7
1893	107	9.4	1	6	3	5	4	10	24	8	4	11	1	7	1	14	1	1	----	2	--	1	1	--		--	--	--	--	--	--	--	1	--	1	22	9.6
1894	208	8.1	2	19	13	14	14	20	34	11	18	23	5	3	2	18	2	----	1	1	--	--	5	--	--	--	1	--	--	1	--	--	--	1	--	82	7.9
1895	139	9.8	1	2	6	11	11	4	27	8	3	21	6	5	1	16	4	----	1	1	--	--	7	--	--	1	--	--	--	1	--	1	--	1	--	63	8.8
Totals	750	8.5	7	41	39	45	55	54	145	55	53	78	20	21	8	71	10	3	2	4	--	5	18	1	1	1	1	1	--	3	--	3	2	2	1	264	8.4

TABLE 10.—*Exhibiting for the three years, 1893–5, the average period of incubation in cases of Measles in Michigan. (Compiled from reports of health officers to the State Board of Health).*

Year.	Instances.	Average Periods of Incubation in days.	Incubation-period in Days—Number of Instances under each Day.																							Incubation—period in certain limits of days.	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Instances.	Average period in days.
1893	39	10.2	----	----	1	3	----	----	7	5	3	7	1	1	----	7	----	----	----	2	----	1	1	----	----	26	12.6
1894	50	11.6	----	----	----	---	1	2	3	2	12	8	----	5	3	6	2	1	----	----	----	1	2	1	1	40	10.5
1895	168	13.0	----	----	1	----	2	2	6	2	3	17	1	2	----	126	3	2	----	----	----	----	1	----	----	58	14.4
Totals	257	11.6	----	----	2	3	3	4	16	9	18	32	2	8	3	139	5	3	----	2	----	2	4	1	1	124	12.5

DURATION OF CASES OF SICKNESS FROM DIPHTHERIA, SCARLET FEVER, TYPHOID FEVER AND MEASLES IN MICHIGAN.

The four tables (11, 12, 13, and 14) exhibit for specified periods, and for each year in those periods, the duration of sickness, in days, of reported cases of diphtheria, scarlet fever, typhoid fever and measles which occurred in Michigan. The tables are compiled from reports in which the dates of being taken sick and of the death or recovery of patients were definitely stated by health officers.

The duration of sickness of each case of a given disease, as computed for these tables, is the number of days which elapsed from the day of being taken sick to the day of death or recovery; the first, but not the last, day inclusive.

Duration of Diphtheria.

TABLE 11.—*Sickness from Diphtheria in Michigan during the three years, 1893–5. Exhibiting, by sex, for fatal and for non-fatal cases, for each year and totals for the three years, the average duration of cases.*

Year.	Cases classified.	Sex.	No. of cases.*	Average duration (in days).
1893	Fatal	Males	192	8.1
		Females	203	8.4
	Non-fatal	Males	442	14.0
		Females	517	13.3
1894	Fatal	Males	131	9.2
		Females	167	9.7
	Non-fatal	Males	503	14.5
		Females	606	14.7
1895	Fatal	Males	135	8.4
		Females	153	7.9
	Non-fatal	Males	394	13.7
		Females	531	14.0
Totals, 3 years, 1893-5	Fatal	Males	458	8.5
		Females	523	8.6
	Non-fatal	Males	1,339	14.1
		Females	1,654	14.0
Totals,—Fatal and Non-fatal, 3 years, 1893-5		Males	1,797	12 6
		Females	2,177	12.8

* Compiled from those reports only which stated the sex and duration (in days) of sickness of patients.

Table 11 exhibits for diphtheria, that of the 981 *fatal* cases reported during the three years 1893–95, 458 were males and 523 females; that in males the average duration of sickness was 8.5 days, and in females 8.6 days, or an average of 8.55 days for the whole 981 cases of both sexes. The greatest number of males died on the fifth and sixth days, and of females on the sixth day of illness. Of the 2,993 cases reported non-fatal, during the three years, 1,339 were males and 1,654 were females. The average duration of sickness in male non-fatal cases was 14.1 days, in females 14.0 days, and in both sexes 14.05 days. The greatest number of male cases recovered on the tenth day from day of being taken sick, and of females on the ninth day.

Of the whole 1,797 cases of sickness (fatal and non-fatal) of males, the average duration was 12.6 days, and in the 2,177 cases (fatal and non-fatal) of females it was 12.8 days.

Duration of Scarlet Fever.

Table 12 shows, for scarlet fever, that during the three years 1893–95, there were 281 fatal and 4,422 non-fatal cases of sickness from scarlet fever reported to this Office of which the dates of beginning and ending were stated. Of the 281 fatal cases 122 were males and 159 females. The average duration of the male fatal cases was 11.9 days, of the female fatal cases 10.4 days, and of the whole 281 fatal cases 11.15 days. Of the 4,422 non-fatal cases 2,025 were males and 2,397 were females. The average duration in the male non-fatal cases was 18.4 days, in the female non-fatal cases 18.6 days, and in the 4,422 non-fatal cases of both sexes 18.5 days.

Of the whole 2,147 cases of sickness, (fatal and non-fatal) of males the average duration was 18.1 days, and of the 2,556 cases (fatal and non-fatal) of females it was 18.2 days.

The greatest number of fatal cases, both male and female, died on the third day of sickness; and the greatest number of non-fatal cases, of both sexes, recovered on the tenth day of sickness.

TABLE 12.—*Sickness from Scarlet Fever in Michigan during the three years, 1893–5. Exhibiting, by sex, for fatal and for non-fatal cases, for each year and totals for the three years, the average duration of cases.*

Year.	Cases classified.	Sex.	No. of cases.*	Average duration (in days).
1893	Fatal	Males	60	10.8
		Females	82	10.7
	Non-fatal	Males	687	17.5
		Females	809	17.3
1894	Fatal	Males	37	14.4
		Females	42	9.3
	Non-fatal	Males	761	17.9
		Females	899	18.2
1895	Fatal	Males	25	10.7
		Females	35	10.8
	Non-fatal	Males	577	20.3
		Females	689	20.7
Totals, 3 years, 1893–5	Fatal	Males	122	11.9
		Females	159	10.4
	Non-fatal	Males	2,025	18.4
		Females	2,397	18.6
Totals,—Fatal and Non-fatal, 3 years, 1893–5		Males	2,147	18.1
		Females	2,556	18.2

* Compiled from those reports only which stated the sex and duration (in days) of sickness of patients. Tables showing the total number of cases of sickness may be found elsewhere.

Duration of Typhoid Fever.

From table 13 it may be seen, relative to typhoid fever, that during the four years 1892–95 there were reported to this Office 756 fatal and 3,395 non-fatal cases of which the dates of beginning and ending were stated. Of the 756 fatal cases 425 were males and 331 females. The average duration of sickness of male fatal cases was 22.6 days, of female fatal cases 20.4 days, and of both sexes combined, 21.5 days. Of the 3,395 non-fatal cases, 1,977 were males and 1,418 were females. The average duration of sickness in male non-fatal cases was 33.5 days, in female non-fatal cases 33.7 days and in non-fatal cases of both sexes combined, it was 33.6 days.

Of the whole 2,402 male cases (fatal and non-fatal) the average duration was 31.5 days; and of the 1,749 female cases (fatal and non-fatal) the duration was 31.1 days.

The greatest number of deaths in males occurred on the thirteenth and twenty-second days of sickness, and in females on the thirteenth day of sickness.

TABLE 13.—*Sickness from Typhoid Fever in Michigan during the four years, 1892–5. Exhibiting, by sex, for fatal and for non-fatal cases, for each year, and totals for the four years, the average duration of cases.*

Year.	Cases classified.	Sex.	No. of cases.*	Average duration (in days).
1892	Fatal	Males	92	20.3
		Females	60	20.3
	Non-fatal	Males	329	34.1
		Females	177	36.7
1893	Fatal	Males	94	24.2
		Females	84	19.5
	Non-fatal	Males	410	32.5
		Females	341	33.4
1894	Fatal	Males	89	22.8
		Females	80	20.8
	Non-fatal	Males	453	34.2
		Females	340	33.2
1895	Fatal	Males	150	22.9
		Females	107	20.7
	Non-fatal	Males	785	33.5
		Females	560	33.1
Totals, 4 years, 1892–5	Fatal	Males	425	22.6
		Females	331	20.4
	Non-fatal	Males	1,977	33.5
		Females	1,418	33.7
Totals, Fatal and Non-fatal, 4 years, 1892–5		Males	2,402	31.5
		Females	1,749	31.1

* Compiled from those reports only which stated the sex and duration (in days) of sickness of patients. Tables showing the total number of cases of sickness may be found elsewhere.

Duration of Measles.

Table 14 exhibits, relative to measles in Michigan during the four years 1892–1895, that there were reported to this Office a total of 4,095 cases of which the beginning and ending were stated. Of these 4,095 cases 50 were reported fatal and 4,045 non-fatal. Of the 50 fatal cases 23 were males and 27 females. The average duration of the fatal male cases was 9.8 days and of the fatal female cases 12.7 days. The duration of fatal cases of both sexes, was about 11.3 days. Of the 4,045 reported non-fatal cases 2,040 were males and 2,005 females. The average duration of the male non-fatal cases was 11.5 days and of the female non-fatal cases 11.0 days.

TABLE 14.—*Sickness from Measles in Michigan during the four years, 1892–5. Exhibiting by sex, for fatal and for non-fatal cases, for each year and totals for the four years, the average duration of cases.*

Year.	Cases classified.	Sex.	No. of cases.*	Average duration (in days).
1892	Fatal	Males	4	9.8
		Females	7	14.0
	Non-fatal	Males	259	11.0
		Females	259	11.4
1893	Fatal	Males	9	7.9
		Females	11	14.0
	Non-fatal	Males	620	11.4
		Females	654	10.7
1894	Fatal	Males	9	9.4
		Females	6	9.0
	Non-fatal	Males	823	12.1
		Females	771	11.6
1895	Fatal	Males	1	30.0
		Females	3	13.0
	Non-fatal	Males	338	11.0
		Females	321	10.7
Totals, 4 years, 1892–5	Fatal	Males	23	9.8
		Females	27	12.7
	Non-fatal	Males	2,040	11.5
		Females	2,005	11.0
Totals, Fatal and Non-fatal, 4 years, 1892–5		Males	2,063	11.5
		Females	2,032	11.2

*Compiled from those reports only which stated the sex and duration (in days) of sickness of patients. Tables showing the total number of cases of sickness may be found elsewhere.

AGE OF OCCURRENCE OF DIPHTHERIA, SCARLET FEVER, TYPHOID FEVER, MEASLES AND CONSUMPTION IN MICHIGAN.

Table 15 exhibits for diphtheria, scarlet fever, typhoid fever and measles for specified periods of years, the total numbers of reported cases of sickness and deaths from these diseases arranged in age groups, by sexes; and the ratio the number of each sex and age bears to each 10,000 of the population of the State of similar sex and age for the same periods.

This table is compiled from reports of health officers, and includes only those cases and deaths of whom the sex and age were stated.

Diphtheria.—Relation to population. Age of occurrence.

From table 15 it appears that of the 6,502 reported cases of diphtheria during the three years 1893–95, 2,940 were males and 3, 562 were females, and that of the 1,368 reported deaths in the same period, 637 were males and 731 females. The ratios the total reported cases of sickness and deaths from diphtheria for the three years bear to the total population of the State of the same sex, and for the same period, are, for males 8.44 cases of sickness and 1.83 deaths; for females 10.98 cases of sickness and 2.25 deaths per 10,000 inhabitants.

Table 15 shows also that the greatest amount of reported sickness and deaths from diphtheria during the three years specified, occurred in the age-period 5 to 9 years. In this period there were 2,106 cases of sickness and 514 deaths, of which 1,039 cases and 246 deaths were of males and 1,067 cases and 268 deaths were of females. The cases of sickness and deaths of males in this age-group were 27.52 and 6.52 respectively per 10,000 population of the State of similar sex and age for the same period, and the cases and deaths of females in this age-group were 28.87 cases and 7.24 per same number of inhabitants of same sex and age.

Table 17 shows that the average age of occurrence in the 2,940 reported male cases was 10.5 years and in the 3,562 reported female cases 13.3 years.

Scarlet Fever.—Relation to population. Age of occurrence.

Table 15 shows relative to scarlet fever, that during the three years 1893–95 there were 7,620 reported cases of sickness and 340 reported deaths of which the age and sex were stated. Of these 3,466 cases and 154 deaths were of males and 4,154 cases and 186 deaths were females. These reported cases and deaths bear the following ratios to the total population of the State of the same sex for the same period:—Males, cases 10.0, deaths .44; females, cases 12.81, deaths .57 per 10,000.

The greatest number of reported cases of sickness occurred in the age-period 5 to 9 years, and the greatest number of deaths in the age-period "under 5 years." In the 5 to 9 age-period the sickness and death rates were:—males, 37.11 cases and 1.30 deaths; females, 46.01 cases and 1.46 deaths per 10,000 population of same age and sex. In the "under 5" age-period, the rates were:—males, cases 27.34, deaths 2.12; females, cases 27.29, deaths 2.27, per 10,000 population of same sex and age.

Table 18 shows that the average age of occurrence of scarlet fever in the 3,466 males there represented was 7.8 years and in the 4,154 females it was 8.8 years.

Typhoid Fever.—Relation to population. Age of occurrence.

Relative to typhoid fever for the five years 1891–95, Table 15 shows that there were 8,384 reported cases of sickness and 1,101 reported deaths of which the sex and age were stated. The greatest number of cases of sickness and deaths in males occurred in the age-period 20 to 24 years, and in females in the age-period 15 to 19 years. The highest sickness-rates in males (17.67 per 10,000) was in the 20–24 age-period; in females it was in the 15 to 19 years period (12.20 per 10,000 of same sex and age). The highest death-rate in males was in the 20 to 24 years age-period and in females in the 15 to 19 years period.

The sickness-rate in males of all ages was 8.37 per 10,000 of the total male population of the State, and in females it was 6.78 per 10,000 of the total female population of the State. The death-rate in males of all ages was 1.11, and in females it was .87 per 10,000 of population of the respective sexes in the State.

Table 19 shows that the average age of the 4,784 reported male cases during the five years was 22.9 years, and of the 3,600 reported female cases it was 21.4 years.

Measles.—Age of Occurrence.

Table 15 shows relative to measles that during the four years 1892–95 there were 9,829 reported cases of sickness and 81 reported deaths of which the age and sex were stated. Of these 4,851 cases of sickness and 40 deaths were of males, and 4,978 cases and 41 deaths were of females.

The greatest number of cases of sickness of both sexes occurred in the 5 to 9 years age-period, and the greatest number of deaths of both sexes in the under 5 years age-period. The highest sickness-rate in both males and females was in the 5 to 9 years age-period; and the highest death-rate in both sexes was in the under 5 years age-period.

Table 20 shows that the average age of the 4,851 reported male cases was 9.4 years and of the 4,978 reported female cases it was 9.9 years.

Consumption.—Age of Occurrence.

Table 18 shows relative to consumption, that during the two years 1894–5, there were 771 reported cases of sickness and 541 reported deaths of which the sex and age were stated; 307 of these cases of sickness were males and 464 were females. The greatest number of male reported cases occurred in the 25 to 29 years age-period; and the greatest number of reported female cases occurred in the 20 to 24 years age-period. The greatest number of deaths of both sexes occurred in the 20 to 24 years age-period. The highest sickness-rate in males was in the 25 to 29 years age-period; in females it was in the 65 to 69 years age-period. The highest death-rate in males was in the "over 75 years" age-period; in females it was in the 65 to 69 years age-period.

TABLE 15.—*Exhibiting for Diphtheria, Scarlet Fever, Typhoid Fever and Measles, by age-groups, the total number of reported cases of sickness and the total number of reported deaths, together with the sickness-rates and death-rates per 10,000 inhabitants of same sex and age, in Michigan, for series of years, stated for each disease. (Compiled from those reports only to the State Board of Health which stated the age and sex of patients.*

Age-groups.	Sex.	Diphtheria, reported.				Scarlet Fever, reported.				Typhoid Fever, reported.				Measles, reported.			
		Totals for 3 years, 1893-95.		Av. annual rates per 10,000 population.		Totals for 3 years, 1893-95.		Av. annual rates per 10,000 population.		Totals for 5 years, 1891-5.		Av. annual rates per 10,000 population.		Totals for 4 years, 1892-5.		Av. annual rates per 10,000 population.	
		Cases of sickness.	Deaths.	Cases of sickness.	Deaths.	Cases of sickness.	Deaths.	Cases of sickness.	Deaths.	Cases of sickness.	Deaths.	Cases of sickness.	Deaths.	Cases of sickness.	Deaths.	Cases of sickness.	Deaths.
Under 1	Males	0	0	--------	--------	--------	--------	--------	--------	1	0	.07	00	13	0	1.16	00
	Females	0	0	--------	--------	--------	--------	--------	--------	0	0	00	00	6	1	.56	.09
1 year	Males	108	41	14.91	5.66	195	16	26.92	2.21	23	8	2.06	.72	268	6	28.83	.64
	Females	93	45	13.47	6.52	166	20	24.01	2.88	22	10	2.06	.94	293	7	33.05	.79
2 years	Males	161	54	19.18	6.43	271	25	32.28	2.98	49	7	3.52	.50	285	3	25.54	.27
	Females	138	49	17.34	6.16	249	25	31.29	3.14	27	2	2.04	.15	278	4	26.22	.38
3 years	Males	177	68	22.00	8.45	313	24	38.90	2.98	54	6	4.06	.45	279	2	26.10	.19
	Females	201	67	25.41	8.48	306	15	38.74	1.90	55	4	4.21	.31	269	2	25.63	.19
4 years	Males	210	66	25.39	7.98	328	21	39.65	2.54	57	3	4.21	.22	332	5	30.36	.46
	Females	199	65	25.36	8.28	337	28	42.94	3.57	58	4	4.49	.31	331	3	31.83	.29
Under 5	Males	656	229	16.24	5.66	1,107	86	27.34	2.12	184	24	2.80	.36	1,177	16	22.09	.30
	Females	631	226	16.28	5.83	1,058	88	27.29	2.27	162	20	2.57	.32	1,177	17	23.05	.33
5 to 9	Males	1,039	246	27.52	6.52	1,401	49	37.11	1.30	530	29	8.52	.47	2,066	10	41.28	.20
	Females	1,067	268	28.87	7.24	1,702	54	46.01	1.46	470	29	7.71	.48	1,983	8	40.43	.16
10 to 14	Males	630	97	18.03	2.78	604	9	17.28	.26	580	41	10.08	.76	777	5	16.76	.11
	Females	753	139	22.15	4.09	856	28	25.18	.82	624	66	11.10	1.18	831	7	18.42	.16
15 to 19	Males	268	42	8.07	1.27	185	6	5.57	.18	607	71	11.16	1.31	341	3	7.77	.07
	Females	364	42	10.99	1.27	281	11	8.48	.33	662	97	12.20	1.79	449	1	10.25	.02
20 to 24	Males	131	12	4.16	.38	72	2	2.29	.06	926	130	17.67	2.48	217	2	5.17	.05
	Females	229	14	7.36	.45	109	3	3.50	.10	502	71	9.80	1.39	214	1	5.19	.02
25 to 29	Males	79	4	2.73	.14	40	2	1.38	.07	704	112	14.64	2.33	106	3	2.75	.08
	Females	155	22	5.70	.81	58	1	2.13	.04	348	50	7.82	1.12	130	2	3.62	.06

30 to 34	Males	55	3	2.05	.11	28	0	1.04	00	457	68	10.25	1.53	77	0	2.16	00
	Females	127	6	5.28	.25	40	0	1.66	00	265	34	6.72	.86	83	2	2.61	.06
35 to 39	Males	32	1	1.32	.04	14	0	.57	00	312	45	7.82	1.13	43	0	1.33	00
	Females	103	5	4.84	.23	27	0	1.27	00	155	22	4.52	.64	55	1	1.97	.04
40 to 44	Males	21	1	1.03	.05	6	0	2.94	00	187	35	5.62	1.05	30	1	1.12	.04
	Females	57	4	3.28	.23	12	1	.69	.06	139	21	4.89	.74	24	0	1.05	00
45 to 49	Males	16	2	.92	.11	7	0	.40	00	123	26	4.31	.91	14	0	.61	00
	Females	30	0	2.00	00	4	0	.27	00	95	16	3.85	.65	14	0	.71	00
50 and over	Males	13	0	.25	00	2	0	.04	00	174	53	2.05	.62	3	0	.04	00
	Females	46	5	1.01	.11	7	0	.15	00	178	38	2.41	.52	18	2	.30	.03
Totals	Males	2,940	637	8.44	1.83	3,466	154	10.00	.44	4,784	637	8.37	1.11	4,851	40	10.53	.09
	Females	3,562	731	10 98	2.25	4,154	186	12.81	.57	3,600	464	6.78	.87	4,978	41	11.62	.10

TABLE 16.—*Exhibiting for Consumption in Michigan for the two years, 1894-5, by age-groups, the total number of reported cases and the total number of reported deaths, together with the sickness-rates and the death-rates per 10,000 inhabitants.*

Consumption, reported.					
Age-group.	Sex.	Totals for 2 years, 1894-5.		Annual average rates per 10,000 population.	
		Cases of sickness.	Deaths.	Cases of sickness.	Deaths.
Under 10	Males	8	6	.15	.11
	Females	11	9	.22	.18
10 to 14	Males	2	1	.09	.04
	Females	21	17	.92	.75
15 to 19	Males	35	26	1.57	1.16
	Females	60	48	2.69	2.16
20 to 24	Males	41	34	1.95	1.62
	Females	75	55	3.59	2.63
25 to 29	Males	45	28	2.33	1.45
	Females	73	45	3.99	2.46
30 to 34	Males	40	26	2.23	1.45
	Females	65	43	4.03	2.66
35 to 39	Males	38	21	2.29	1.27
	Females	45	32	3.12	2.22
40 to 44	Males	25	17	1.82	1.24
	Females	32	23	2.73	1.97
45 to 49	Males	15	9	1.28	.77
	Females	18	13	1.79	1.29
50 to 54	Males	16	11	1.56	1.07
	Females	12	7	1.32	.77
55 to 59	Males	10	6	1.36	.81
	Females	12	9	1.81	1.36
60 to 64	Males	15	8	2.32	1.24
	Females	9	6	1.61	1.07
65 to 69	Males	5	5	1.09	1.09
	Females	20	17	5.07	4.31
70 to 74	Males	6	3	1.82	.91
	Females	6	5	2.22	1.85
75 and over	Males	6	6	1.93	1.93
	Females	5	5	1.83	1.83
Totals	Males	307	207	1.31	.89
	Females	464	334	2.13	1.53

TABLE 17.—*Sickness from Diphtheria in Michigan during the three years, 1893–5. Exhibiting, by sex, for fatal and for non-fatal cases, for each year and totals for the three years, the average age of cases.*

Year.	Cases classified.	Sex.	No. of cases.*	Average age in years.
1893	Fatal	Males	207	8.1
		Females	228	8.8
	Non-fatal	Males	660	11.9
		Females	769	15.0
1894	Fatal	Males	180	7.8
		Females	232	9.8
	Non-fatal	Males	788	11.9
		Females	978	14.8
1895	Fatal	Males	250	6.4
		Females	271	8.3
	Non-fatal	Males	855	10.6
		Females	1,084	13.5
Totals, 3 years, 1893-5	Fatal	Males	637	7.4
		Females	731	8.9
	Non-fatal	Males	2,303	11.4
		Females	2,831	14.4
Totals,—Fatals and Non-fatals, 3 years, 1893-5		Males	2,940	10.5
		Females	3,562	13.3

* Compiled from those reports only which stated the age and sex of the patients.

TABLE 18.—*Sickness from Scarlet Fever in Michigan during the three years, 1893–5. Exhibiting, by sex, for fatal and for non-fatal cases, for each year and totals for the three years, the average age of cases.*

Year.	Cases classified.	Sex.	No. of cases.*	Average age in years.
1893	Fatal	Males	73	5.4
		Females	93	7.1
	Non-fatal	Males	1,133	7.9
		Females	1,367	8.7
1894	Fatal	Males	42	5.0
		Females	49	5.6
	Non-fatal	Males	1,122	8.2
		Females	1,382	8.8
1895	Fatal	Males	39	6.2
		Females	44	6.8
	Non-fatal	Males	1,057	7.8
		Females	1,219	9.1
Totals, 3 years, 1893-5	Fatal	Males	154	5.5
		Females	186	6.6
	Non-fatal	Males	3,312	8.0
		Females	3,968	8.9
Totals,—Fatals and Non-fatals, 3 years, 1893-5		Males	3,466	7.8
		Females	4,154	8.8

* Compiled from those reports only which stated the age and sex of the patients.

TABLE 19.—*Sickness from Typhoid Fever in Michigan during the five years, 1891–5. Exhibiting, by sex, for fatal and for non-fatal cases, for each year and totals for the five years, the average age of cases.*

Year.	Cases classified.	Sex.	No. of cases.*	Average age in years.
1891	Fatal	Males	111	26.9
		Females	74	28.2
	Non-fatal	Males	784	22.9
		Females	486	21.8
1892	Fatal	Males	116	28.4
		Females	68	20.4
	Non-fatal	Males	595	23.0
		Females	438	20.4
1893	Fatal	Males	121	27.6
		Females	101	22.8
	Non-fatal	Males	952	21.5
		Females	793	20.8
1894	Fatal	Males	113	25.7
		Females	97	27.6
	Non-fatal	Males	700	22.1
		Females	552	20.9
1895	Fatal	Males	176	28.4
		Females	124	22.6
	Non-fatal	Males	1,116	22.2
		Females	867	21.0
Totals, 5 years, 1891-5.	Fatal	Males	637	27.5
		Females	464	24.5
	Non-fatal	Males	4,147	22.2
		Females	3,136	21.0
Totals,—Fatals and Non-fatals, 5 years, 1891–5		Males	4,784	22.9
		Females	3,600	21.4

*Compiled from those reports only which stated the age and sex of the patients.

TABLE 20.—*Sickness from Measles in Michigan during the four years, 1892–5. Exhibiting, by sex, for fatal and for non-fatal cases, for each year and the totals for the four years, the average age of cases.*

Year.	Cases classified.	Sex.	No. of cases.*	Average age in years.
1892	Fatal	Males	17	8.2
		Females	17	9.1
	Non-fatal	Males	362	10.8
		Females	390	11.1
1893	Fatal	Males	10	11.2
		Females	12	19.2
	Non-fatal	Males	1,446	10.3
		Females	1,596	10.2
1894	Fatal	Males	11	10.4
		Females	9	9.7
	Non-fatal	Males	2,424	8.5
		Females	2,263	9.0
1895	Fatal	Males	2	8.5
		Females	3	5.0
	Non-fatal	Males	579	9.9
		Females	588	11.2
Totals, 4 years, 1892–5	Fatal	Males	40	9.6
		Females	41	12.0
	Non-fatal	Males	4,811	9.4
		Females	4,937	9.8
Totals,—Fatals and Non-fatals, 4 years, 1892–5		Males	4,851	9.4
		Females	4,978	9.9

* Compiled from those reports only which stated the age and sex of the patients.

EFFICACY OF ISOLATION AND DISINFECTION IN RESTRICTING DANGEROUS COMMUNICABLE DISEASES IN MICHIGAN.

The laws of Michigan provide that local health officials shall report to the State Board of Health the occurrence of all outbreaks of dangerous communicable diseases which occur in their jurisdictions; and that efforts shall be made for the restriction and prevention of such diseases.

For a number of years past the State Board has persistently demanded compliance by health officers and local boards of health, with these provisions of law, and incessantly urged the adoption of restrictive and preventive measures in connection with every outbreak of such disease.

The principal measures recommended by the State Board for adoption by local health officials in the prevention and restriction of dangerous communicable diseases, are isolation of every person sick with one of those diseases from all other persons except necessary attendants and attending physicians, and complete disinfection of all rooms, and articles of any kind which may, either by personal contact with, or near proximity to, those sick have become infected with the germs of such diseases.

A large number of health officials comply with the provisions of the health laws, and act on the recommendations of the State Board relative to isolation and disinfection. On the other hand, there are many instances in which, for one reason or another the people of the locality neglect to avail themselves of isolation and disinfection to prevent the spread of disease. Another class of health officials report to the State Board the occurrence of all outbreaks of communicable diseases in their jurisdictions, but fail to state satisfactorily in their reports whether or not they acted on the recommendations of the State Board relative to isolation and disinfection.

During a series of years all information contained in reports to this Office relative to the application of isolation and disinfection in outbreaks of dangerous communicable diseases, has been carefully compiled with a view of ascertaining, if possible, the efficacy of those measures in restricting the prevalence of those diseases. Table 21 and accompanying two diagrams (Plates 879 and 887), present some of the results of the collation of that information.

Diphtheria.—Results of isolation and disinfection.

Relative to Diphtheria, Table 21 shows that in 512 outbreaks of the disease reported during the nine years 1887–95 relative to which health officers stated that isolation and disinfection were neglected, there occurred a total of 6,698 cases of sickness and 1,417 deaths, or an average of 13.08 cases and 2.77 deaths per outbreak; whereas in the 580 outbreaks which were reported to have occurred in the same period and in which it was stated that isolation and disinfection were enforced, there occurred only 1,210 cases of sickness and 278 deaths an average of 2.09 cases and .48 of one death per outbreak, thus showing that the sickness and death attending outbreaks which were treated in conformity with the recommendations of this Board were only about one-sixth as great as attended outbreaks where those recommendations were neglected.

Scarlet Fever.—Results of isolation and disinfection.

Table 21 shows that the experiences of health officers with isolation and disinfection in outbreaks of scarlet fever during the nine years 1887–95 were very similar to those reported for diphtheria. In the 820 reported outbreaks of scarlet fever during the nine years in which isolation and disinfection were stated to have been neglected, there occurred 13.21 cases of sickness and .54 of one death per outbreak, and in those 504 outbreaks, during the same period, in which those restrictive measures were enforced there were only 2.29 cases of sickness and .11 of one death per outbreak,—nearly six times as many cases of sickness and five times as many deaths in outbreaks where isolation and disinfection were neglected as there were in outbreaks where those measures were enforced.

Typhoid Fever.—Results of isolation and disinfection.

Relative to typhoid fever the experiences comprised in table 21 extend over a shorter period (six years, 1890–95) and embrace a less number of outbreaks than do those relative to diphtheria and scarlet fever. We have, however, 395 reported outbreaks of typhoid fever during the six years in which isolation and disinfection were neglected, with an average of 8.02 cases of sickness and 1.01 deaths per outbreak; whereas in the same period there were 269 reported outbreaks in which isolation and disinfection were enforced, with only 2.51 cases of sickness and .35 of one death per outbreak or over three times as many cases of sickness and nearly three times as many deaths in outbreaks where isolation and disinfection were neglected as there were in those outbreaks where those restrictive measures were enforced.

Measles.—Results of isolation and disinfection.

Table 21 shows relative to measles that during the six years 1890–95 there were 355 reported outbreaks in which isolation and disinfection were neglected with an average of 56.08 cases of sickness and .44 of one death per outbreak; and 182 reported outbreaks in which isolation and disinfection were enforced with an average of 2.53 cases of sickness and no deaths per outbreak, or over 22 times as many cases in the neglected outbreaks as there were in those outbreaks where restrictive measures were enforced.

TABLE 21.—*Exhibiting for Diphtheria and Scarlet Fever for the nine years, and each of the nine years, 1887–95, and for Typhoid Fever and Measles, for the six years and each of the six years, 1890–95, the numbers of outbreaks, cases and deaths and the average numbers of cases and deaths, in all reported outbreaks of those diseases; also the numbers of outbreaks, cases and deaths in outbreaks where Isolation and Disinfection were neglected and where those measures were enforced; and the indicated saving of cases of sickness and lives by Isolation and Disinfection.* (*Compiled in the Office of the Secretary of the State Board of Health from reports of local officials.*)

DIPHTHERIA.

Year.	All Outbreaks.					Isolation and Disinfection both Neglected.					Isolation and Disinfection both Enforced.					Indicated Saving of Cases and Lives by Isolation and Disinfection.	
	Out-breaks.	Cases.	Deaths.	Average per outbreak.		Out-breaks.	Cases.	Deaths.	Average per outbreak.		Out-breaks.	Cases.	Deaths.	Average per outbreak.			
				Cases.	Deaths.				Cases.	Deaths.				Cases.	Deaths.	Cases.	Lives.
1887	398	2,321	561	5.83	1.41	60	822	195	13.70	3.25	78	198	51	2.54	0.65	3,132	733
1888	311	1,529	324	4.92	1.04	34	527	81	15.50	2.38	58	101	31	1.74	0.53	3,292	416
1889	376	1,986	418	5.28	1.11	41	478	108	11.66	2.63	63	98	14	1.56	0.22	2,398	571
1890	439	2,713	619	6.18	1.41	71	902	169	12.70	2.38	46	70	15	1.52	0.33	2,862	426
1891	532	2,965	643	5.57	1.21	79	944	194	11.95	2.46	70	157	33	2.24	0.47	3,392	666
1892	525	3,485	740	6.64	1.41	52	657	147	12.63	2.83	49	105	24	2.14	0.49	3,146	746
1893	536	3,133	746	5.85	1.39	74	1,020	282	13.78	3.81	65	159	45	2.45	0.69	4,253	1,296
1894	420	2,262	404	5.39	.96	56	738	122	13.18	2.18	81	176	37	2.17	0.46	3,274	512
1895	388	2,292	425	5.91	1.10	45	610	119	13.56	2.64	70	146	28	2.09	0.40	2,969	599
Totals	3,925	22,686	4,880	....	....	512	6,698	1,417	....	....	580	1,210	278	....	....	28,718	5,965
Averages	436	2,521	542	5.78	1.24	57	744	157	13.08	2.77	64	134	31	2.09	.48	3,191	663

SCARLET FEVER.

1887	299	1,882	141	6.29	0.47	32	440	34	13.75	1.06	64	148	11	2.31	0.17	2,229	176
1888	340	1,838	112	5.41	0.33	61	724	33	11.89	0.54	36	80	3	2.22	0.08	2,198	72
1889	417	2,822	123	6.77	0.29	72	1,208	48	16.78	0.67	52	140	10	2.69	0.19	4,175	156
1890	477	3,054	115	6.40	0.24	94	1,137	36	12.10	0.38	42	76	1	1.81	0.02	2,718	66
1891	602	4,936	193	8.20	0.32	141	1,704	66	12.09	0.47	42	107	1	2.55	0.02	2,342	90
1892	622	5,240	306	8.42	0.49	110	1,621	59	14.74	0.54	42	97	7	2.31	0.17	3,928	30
1893	667	5,219	327	7.82	0.49	124	1,511	99	12.19	0.80	60	157	8	2.62	0.13	2,912	207
1894	662	4,349	175	6.57	0.26	104	1,348	42	12.96	0.40	74	187	9	2.53	0.12	4,231	90
1895	555	2,905	85	5.23	0.15	82	1,138	27	13.88	0.33	92	162	4	1.76	0.04	4,798	98
Totals	4,641	32,245	1,577	....	....	820	10,831	444	....	....	504	1,154	54	....	....	29,531	985
Averages	516	3,583	175	6.95	.34	91	1,203	49	13.21	.54	56	128	6	2.29	.11	3,281	109

TYPHOID FEVER.

1890	330	1,924	304	5.83	0.92	53	349	51	6.58	0.96	38	75	12	1.97	0.22	247	13
1891	541	4,018	607	7.43	1.12	56	1,196	114	21.36	2.04	31	54	9	1.74	0.29	7,538	497
1892	524	2,195	416	4.19	0.79	41	183	38	4.46	0.93	35	65	9	1.86	0.26	142	71
1893	539	2,255	405	4.10	0.75	47	240	25	5.11	0.53	33	54	8	1.64	0.24	499	*0
1894	596	2,537	405	4.26	0.68	61	282	32	4.62	0.52	47	132	15	2.81	0.32	217	*0
1895	792	3,453	524	4.36	0.66	137	917	138	6.69	1.01	85	294	41	3.46	0.48	1,845	276
Totals	3,322	16,382	2,661	....	....	395	3,167	398	....	....	269	674	94	....	....	10,488	857
Averages	554	2,730	444	4.93	0.80	66	528	66	8.02	1.01	45	112	16	2.51	0.35	1,748	143

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TABLE 21.—CONCLUDED.

MEASLES.

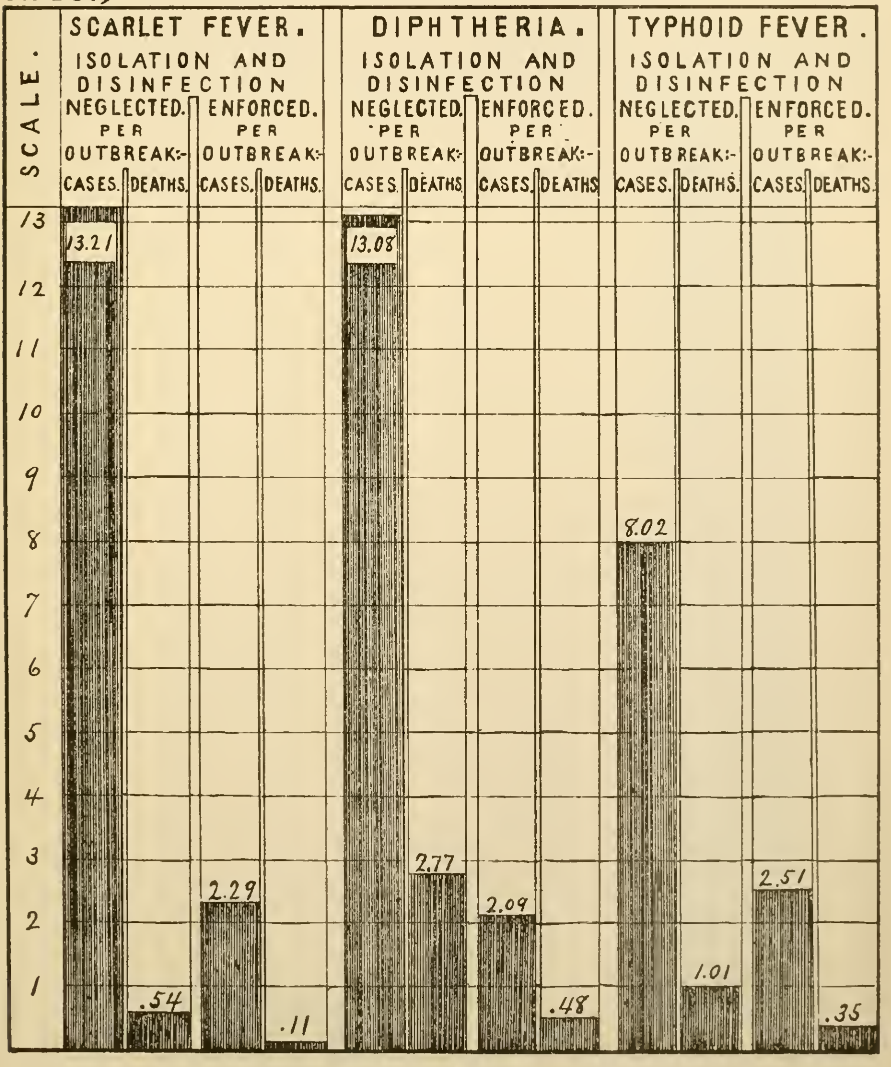
Year.	All Outbreaks.					Isolation and Disinfection both Neglected.					Isolation and Disinfection both Enforced.					Indicated Saving of Cases and Lives by Isolation and Disinfection.	
	Out-breaks.	Cases.	Deaths.	Average per outbreak.		Out-breaks	Cases.	Deaths.	Average per outbreak.		Out-breaks.	Cases.	Deaths.	Average per outbreak.		Cases.	Lives.
				Cases.	Deaths.				Cases	Deaths.				Cases.	Deaths.		
1890	419	11,189	103	26.70	0.25	57	4,819	44	84.54	0.77	6	19	0	3.17	0	24,233	220
1891	392	12,338	118	31.47	0.03	71	5,920	63	83.38	0.89	11	27	0	2.45	0	20,347	231
1892	236	4,406	67	18.67	0.28	31	1,953	22	63.00	0.71	7	8	0	1.14	0	10,462	101
1893	357	5,440	71	15.21	0.19	70	2,681	14	38.30	0.20	10	24	0	2.40	0	8,233	*0
1894	358	7,345	49	20.52	0.14	70	2,971	7	42.44	0.10	13	32	0	2.46	0	7,849	*0
1895	269	4,462	13	16.59	0.05	56	1,563	6	27.90	0.11	25	72	0	2.88	0	3,043	17
Totals	2,031	45,180	421	--------	--------	355	19,907	156	--------	--------	72	182	0	--------	--------	74,167	569
Averages	339	7,530	70	22.25	0.21	59	3,318	26	56.08	0.44	12	30	0	2.53	0	12,361	95

* By the last column in Table 21 it may be seen that there is no apparent saving of lives from typhoid fever and measles in the years 1893 and 1894. This showing is due to the fact that health officers failed, in a great many instances, to state whether or not restrictive measures were adopted in outbreaks of these diseases; or, made doubtful statements relative thereto. In compiling data relative to outbreaks of communicable diseases the absence of positive statements relative to them, necessitates the placing of them in the doubtful class; and, relative to typhoid fever and measles, the number of outbreaks in that class is consequently increased to a very large percentage of the whole number of outbreaks which occurred. It is probable that if full information could be obtained relative to every outbreak in the doubtful class, many of them would be found to have been neglected, the neglected class thereby greatly increased, and a saving of lives shown.

Another fact which may have a bearing on this subject is, that the sickness and deaths from typhoid fever and measles, which occurred in Detroit and Grand Rapids, where these diseases prevail more or less nearly all the time, and where no doubt many outbreaks are neglected, are (for reasons explained in the articles on typhoid fever and measles in this Report) not included in Table 21. The same is true of Ironwood in 1893, where typhoid fever was extensively epidemic during the year and from it a large number of cases of sickness and deaths occurred.

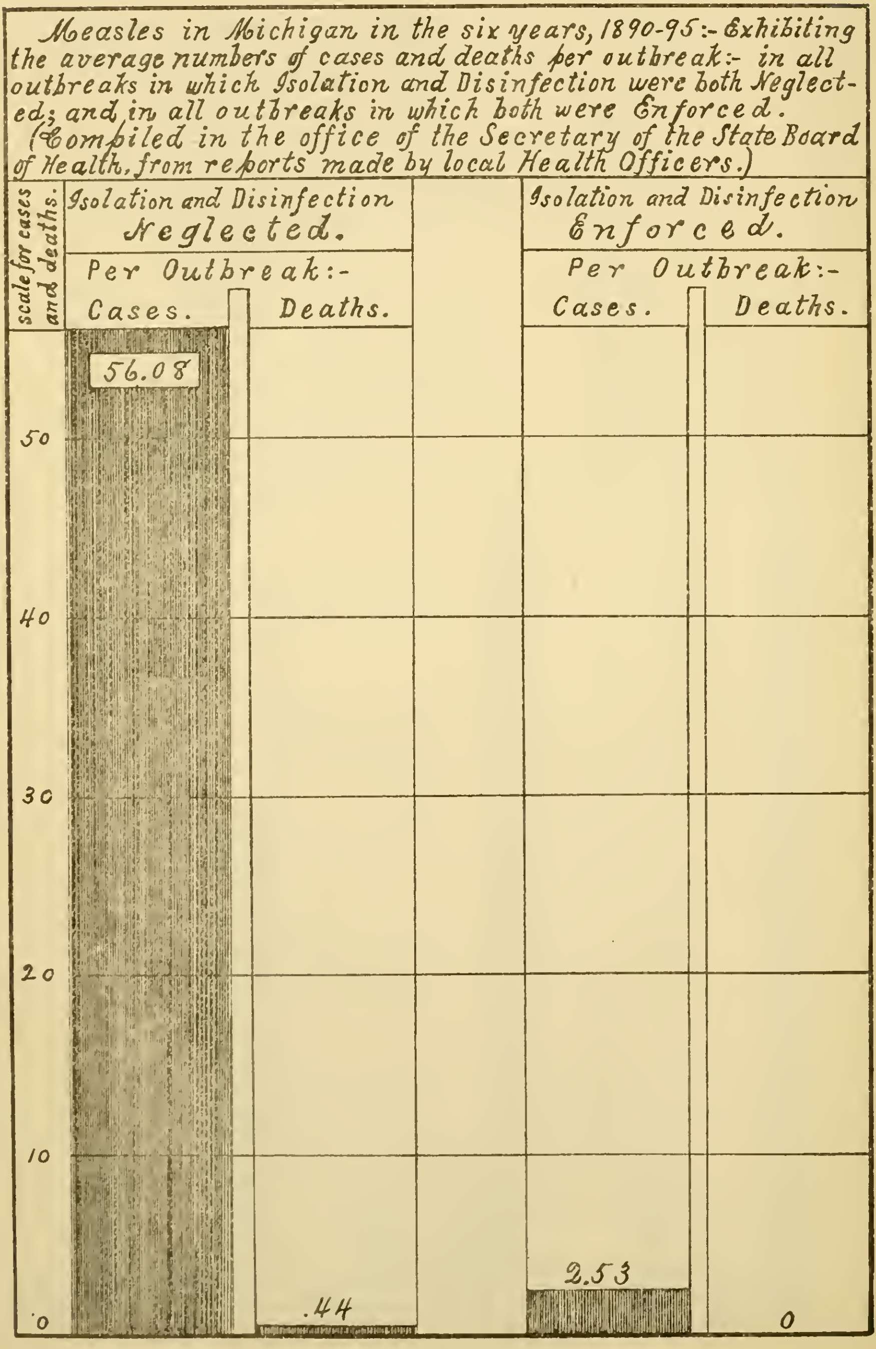
Until more perfect reports relative to outbreaks of typhoid fever and measles are obtainable, it will not be possible, in this manner, by itself, to determine with any great degree of accuracy the effects of applied isolation and disinfection in the prevention of sickness and deaths from those diseases.

ISOLATION AND DISINFECTION RESTRICTED DIPHTHERIA, SCARLET FEVER AND TYPHOID FEVER IN MICHIGAN: DIPHTHERIA AND SCARLET FEVER, 9 YEARS 1887-95, TYPHOID FEVER, 6 YEARS, 1890-95; EXHIBITING, FOR EACH DISEASE, THE AVERAGE NUMBERS OF CASES AND DEATHS PER OUTBREAK: IN ALL OUTBREAKS IN WHICH BOTH ISOLATION AND DISINFECTION WERE NEGLECTED, AND IN ALL OUTBREAKS IN WHICH THOSE RESTRICTIVE MEASURES WERE ENFORCED. (COMPILED IN THE OFFICE OF THE SECRETARY OF THE STATE BOARD OF HEALTH, FROM REPORTS OF LOCAL OFFICIALS.)



[PLATE 879]

ISOLATION AND DISINFECTION RESTRICT MEASLES.



Measles in Michigan in the six years, 1890-95:- Exhibiting the average numbers of cases and deaths per outbreak:- in all outbreaks in which Isolation and Disinfection were both Neglected; and in all outbreaks in which both were Enforced.
(Compiled in the office of the Secretary of the State Board of Health, from reports made by local Health Officers.)

[PLATE 887]

Table 21 and accompanying diagrams (Plates 879 and 887) demonstrate several facts which have an important bearing upon public-health work in Michigan:—

1. That in a large number of outbreaks of diphtheria, scarlet fever, typhoid fever and measles, isolation and disinfection restricted those diseases far below the average occurrence in outbreaks in which restrictive measures were neglected; and that it is therefore reasonable to assume that if communicable diseases can, in large numbers of instances, be thus restricted, there exists no good reason why they should not be restricted in *all* instances and their occurrence, if not entirely prevented, at least reduced to a minimum of frequency.

2. That by the restriction of diphtheria, scarlet fever, typhoid fever and measles in Michigan during the periods named in the table and diagrams, 20,581 cases of sickness and 1,010 deaths annually have been prevented.

Human suffering cannot be estimated in money values, but the prevention of these 20,581 cases of sickness and 1,010 deaths annually, by isolation and disinfection, has probably saved the State from pecuniary losses which would aggregate over a million dollars annually.

INJURIES AND LOSS OF LIFE AND PROPERTY ALLEGED TO HAVE BEEN CAUSED BY THE USE OF KEROSENE, IN MICHIGAN, DURING THE YEAR ENDING DECEMBER 31, 1895.

Continuing a practice pursued in previous years, the Office of the Secretary of the State Board of Health, has, during the year 1895, sought to obtain information relative to each casualty, alleged to have been caused by the use of kerosene, which came to the notice of said Office.

The principal sources from which this Office obtains facts in regard to such casualties as above mentioned, are four, viz.: from reports by the Fire Marshal of Detroit, State Inspectors and Deputy Inspectors of Illuminating Oils, Local Health Officers, and from newspaper reports. Relative to the last of these sources of information, it should be stated that the Secretary of this Board does not accept as necessarily authentic, newspaper reports of casualties from the use of kerosene. When such reports come to his knowledge, he applies to the proper officials of the localities in which they are said to have occurred, for confirmation or contradiction of the reports, and for any information which these officials may be able to give in connection with the alleged casualties. A copy of the form of letter used on such occasions, is given in the Annual Report of this Board for the year 1892, page 334. The data collected from these sources show that during the year 1895, information was received at this office, of the occurrence of 44 casualties consequent on the use of kerosene in Michigan. These casualties were reported to have occurred in 3 localities, causing loss of 1 life, injury (non-fatal) to 1 person, and damage of property to the amount of $28,121.

This reported damage does not include all the actual pecuniary loss occasioned by the above-mentioned casualties, because in some instances where houses, barns and other property were destroyed the loss was not reported.

TABLE 1.—*Casualties in Michigan during the year 1895, believed to have been consequent on the use of Kerosene, information of which was received at the Office of the Secretary of the State Board of Health. In this year the legal test was a Flash Test at 120° Fah., in a Foster Automatic Tester.**

	Number of Casualties	Number of Localities.	Pecuniary losses, Dollars.	Lives lost.	Persons injured. (not fatally).
In Detroit	42	1	27,471	0	0
In State (outside Detroit)	2	2	650	1	1
Totals	44	3	28,121	1	1

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* In 1893, the legal test of kerosene, for illuminating purposes, was, by legislative enactment (Section 2, Act 94, Public Acts of 1893) made as follows: "It shall be the duty of the inspector and his deputies to provide themselves at their own expense with the necessary instruments and apparatus for testing the quality of said illuminating oils, and when called upon for that purpose to promptly inspect all oils hereinbefore mentioned, and to reject for illuminating purposes all oils which will emit a combustible vapor at a temperature of one hundred and twenty degrees of Fahrenheit's thermometer: *Provided*, The quantity of oil used in the flash test shall not be less than half pint. The oil tester adopted shall be the Foster automatic tester cup, with the lighted wick placed inside the tube, and under the thimble which shall be used by the inspector and his deputies." Act 94 became operative July 1, 1893.

Casualties from the Use of Kerosene in 1895 Compared with Previous Years.

TABLE 2.—*Exhibiting the number of casualties believed to have been consequent on the use of Kerosene* in Michigan *(including the city of Detroit), information of which was received at the office of the Secretary of the State Board of Health in each of the seven years, 1889–1895. The legal test of Kerosene in each year is explained in the* [*]*footnote to this Table.*

Year.	Number of Casualties.	Amount of damage done, Dollars.	Number of Lives lost.	Number of Casulties caused by Lamp explosions.	Number of Casualties caused by Stove explosions.
1889	53	[†]74,049	8	16	2
1890	55	18,282	2	22	6
First six months of 1891	[‡]30	10,778	2	19	2
Last six months of 1891	[‡]118	42,050	9	74	6
Total for the year 1891	148	52,828	11	93	8
1892	134	66,106	7	75	17
First six months of 1893	43	25,958	0	21	10
Last six months of 1893	40	23,542	2	22	5
Total for the year 1893	83	49,500	2	43	15
1894	64	20,374	9	29	1
1895	44	28,121	1	18	0

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[*] In the years 1889, 1890, and the first half of 1891, the legal test was a Flash test at 120 degrees Fah., in a closed tester; and in the last half of 1891, in 1892 and the first half of 1893, it was a Burning test at 120 degrees Fah., in an open tester, which, because it varies greatly, is equal to a Flash test of from 95 to 110 degrees Fah., probably averages about equal to a Flash test of 100 degrees Fah., in a closed tester, like the one approved by the State Board of Health. The last half of 1893, and in 1894 and 1895 the legal test was a Flash test at 120° Fah., in the Foster Automatic Tester, which has not been approved by the State Board of Health.

[†] The total reported damage ($74,049) for 1889 includes, $40,000 damage caused by a single fire at 678 Jefferson street, Detroit. The fire was caused by a careless manipulation of an oil heater used for heating a conservatory, and "was not the result of the grade of the oil used."

[‡] Included in these numbers are data relative to 27 reported casualties in 1891, of which the exact dates of occurrence were not reported. In order to make an equitable distribution of these between the first and last halves of the year a proportionate division of them is made, based on the data contained in Table 2 of this article, thus: Table 2 shows that *exclusive* of the above-mentioned 27 casualties, there were reported 121 casualties in the State, in 1891; that 24 (about 20 per cent) of these, occurred in the first half of the year, and 97 (about 80 per cent) occurred in the last half of the year. The 27 casualties, the dates of which are not given, are divided between the first and last halves of the year in the same proportion, that is, 20 per cent of them are added to the first half, and 80 per cent to the last half of the year.

TABLE 3.—*Exhibiting the number of casualties believed to have been consequent on the use of Kerosene* in Detroit *during each of the years, 1889–1895.* (*Reported by the Fire Marshal of Detroit to the Office of the State Board of Health.*) *The legal test of Kerosene in each year is explained in the *footnote to Table 2 of this article.*

Year.	Number of Casualties.	Amount of damage done, Dollars.	Number of Lives lost.	Number of Casualties caused by Lamp explosions.	Number of Casualties caused by Stove explosions.
1889	35	*65,250	3	14	2
1890	44	18,282	0	15	6
First six months of 1891	14	2,878	0	9	2
Last six months of 1891	41	9,760	2	26	5
Total for year 1891	55	12,638	2	35	7
1892	79	39,306	2	37	13
First six months of 1893	37	20,958	0	19	10
Last six months of 1893	34	18,536	0	19	5
Total for year 1893	71	39,494	0	38	15
1894	55	18,844	3	28	1
1895	42	27,471	0	17	0

*The total reported damage for 1889 includes, $40,000 damage caused by a single fire at 678 Jefferson street. The fire was caused by careless manipulation of an oil heater used for heating a conservatory, and "was not the result of the grade of the oil used."

The foregoing tables (2 and 3), based, for 1895, on the data from which Table 1 in this article is constructed and for 1889, 1890, 1891, 1892, 1893, and 1894 on similar data for those years, are designed to facilitate comparison of the number of casualties and the resultant damages, which occurred in the State from the use of kerosene during those years.

The following lists of casualties show the localities in which the casualties occurred, the nature of each casualty, the damage caused thereby and whatever other details in regard to them this Office has been able to collect.

List of Casualties consequent on the use of Kerosene in Michigan outside the city of Detroit, calendar year 1895.

Date in 1895.	Locality.	Nature of Casualty.	Amount of Damage, Dollars.	Injury to person.
Nov. 24	Menominee City	Lamp falling	400	A woman fatally and a man non-fatally burned.
" 27	Meridian Tp.	Lamp exploded	250	

List of Casualties consequent on the use of Kerosene, in Detroit, Calendar Year, 1895. (Supplied by William H. Baxter, Fire Marshal in Detroit.)

Date in 1895.	Street and Number.	Nature of Casualty.	Amount of Damage, Dollars.	Injury to Person.
Feb. 25	825 Lafayette	Stove upset	30	
" 25	336 31st	Careless use of lamp	1,002	
" 28	445 Riopelle	Lamp exploded	70	
Mar. 11	59 15th	Lamp exploded	450	
" 16	597 Cheese	Lamp exploded	755	
" 17	210 Wreford	Oil heater collapsed	222	
" 18	1307 14th Ave	Oil took fire while lamp was being filled.	47	
" 19	33 Canfield West	Oil heater collapsed	1,500	
" 29	16 Mark	Careless use of lamp	706	
" 29	183 Grand River	Oil heater collapsed	150	
" 29	216 Orleans	Lamp accidentally dropped	49	
" 31	71 Grand River	Stove collapsed	65	
Apr. 6	25 Macomb	Heater collapsed	135	
" 13	415 Michigan	Lamp exploded	3,171	
" 15	683 16th	Lamp exploded	1,499	
" 15	396 Michigan	Lamp upset	130	
" 27	68 Junction	Lamp exploded	35	
May 28	38 Spence	Lamp upset	67	
June 1	840 Beaubien	Lamp exploded	49	
" 4	69 Brandon	Lamp exploded	478	
" 29	474 Monroe	Lamp tipped over	53	
July 13	22 32nd	Lamp exploded	407	
Aug. 9	175 Division	Oil stove leaked	30	
Sept. 3	917 Ferry	Lamp too close to ceiling	593	
" 3	164 24th	Lamp exploded	363	
" 17	385 Fort East	Lamp exploded	25	
" 25	13 Rowland	Lamp tipped over	230	
" 26	810 Witherell	Stove leaked	8,214	
Oct. 4	220, 222, 224 Leland	Lamp exploded	2,994	
" 4	854 Mitchell	Lamp exploded	417	

List of Casualties consequent on the use of Kerosene in Detroit.—CONCLUDED.

Date in 1895.	Street and Number.	Nature of Casualty.	Amount of Damage, Dollars.	Injury to Person.
Oct. 16	130 Columbia East	Oil stove collapsed	648	
" 25	Foot of 11th	Lamp knocked	25	
" 27	1232 Sheridan	Lamp upset	10	
Nov. 7	345 Jay	Lamp exploded	300	
" 11	337 Michigan	Lamp too near clothing	1,299	
" 11	235 Baker	Stove collapsed	10	
" 14	401 Michigan	Lamp exploded	62	
" 25	477 Hastings	Lamp exploded	20	
" 26	101 Theodore	Stove collapsed	450	
Dec. 6	800 St. Aubin	Lamp exploded	11	
" 10	212 Griswold	Stove collapsed	550	
" 28	815 Fort East	Stove collapsed	150	

Table 2 shows that in the *State, including* the city of Detroit, there were reported to have occurred 44 casualties, resulting in pecuniary losses amounting to $28,121.00, and the loss of life of 1 person. Eighteen (about 41 per cent) of these casualties were attributed to lamp explosions.

The remaining 26 casualties were attributed to other causes as follows:—Lamps upset, 4; fallen lamps, 3; broken lamps, 1; lamps held too close to clothing, 1; stoves upset, 1; stoves collapsed, 10; lamp placed too near ceiling, 1; other careless use of keresene, 5.

In tables 2 and 3, the years 1891 and 1893 are divided into two parts, one comprising the first six months and the other the last six months of those years. The reason for this division is, that the laws regulating the legal test of kerosene in the State were, by legislative enactment, changed during those years, the new laws becoming operative on July first of each of those years. This arrangement of tables 2 and 3, therefore, gives opportunity not only for comparison of the prevalence of casualties in 1891 and 1893 with the other years; but also of the comparative prevalence of casualties in the first and last halves of 1891 and 1893, under the provisions of the old and new test laws.

In 1889, 1890 and the first six months of 1891, the legal test of kerosene in this State was a *Flash* test at 120 degrees Fah. in a *closed* tester, approved by the State Board of Health; that is, that the sale and use of oils which, in a *closed* tester, similar to a lamp, would emit an explosive vapor at a temperature lower than 120 degrees Fah. was prohibited. The law, which took effect July 1, 1891, made the legal test a *Burning* test at 120 degrees Fah. in an *open* tester, not approved by the State Board of Health. That is, the law of 1891 prohibited only the sale of kerosene which would *burn* in an *open* tester at a lower temperature than 120 degrees Fah. As kerosene will emit an explosive vapor at a much lower temperature than that at which it will continue to burn in the open air where the vapor is carried away as fast as formed, and because of the variation in tests in an *open* tester, dependent on varying atmospheric currents and conditions, it is believed that the new *burning* test, at 120 degrees Fah. would probably average not more than equal to a *Flash* test at 100 degrees Fah. in a *closed* tester, like the "State Board of Health Tester." That is to say, that an oil which would burn at a temperature of 120 degrees Fah. in an *open* tester, would probably, when heated to a temperature of 100 degrees Fah. in a *closed* tester, emit explosive gas which would flash; although the same oil if heated in an *open* tester, might, under some conditions, not flash at a temperature lower than 110 degrees Fah.

In a series of 64 experiments made by Dr. R. C. Kedzie,* with kerosene obtained from various sources, it was found that oils, the average *burning* temperature of which was 128 degrees Fah., *flashed* at an average temperature of 117 degrees Fah. Based on the same proportion, oils which would *burn* at 120 degrees Fah. would emit explosive gas which would *flash* at a temperature of 109.7 degrees Fah.

Experiments made by Prof. Chandler† to ascertain the temperature of kerosene in lamps after they had been burning a number of hours, showed that in one instance he found the temperature 120 degrees, in another 118 degrees, and in another 104 degrees; an average temperature for the three instances of 114 degrees, which is 4.3 degrees higher than the average *flashing* point of oils, the average *burning* point of which is 120 degrees Fah. These experiments seem to show that oil in burning lamps sometimes attains a higher temperature than the *flashing* point of oils, whose *burning* point is 120 degrees Fah. It would therefore seem that oils which would meet the requirements of the Michigan legal test, established in 1891, may, in burning lamps, attain a higher temperature than that at which they would emit explosive gas, and are, therefore, dangerous; for, no oil can be considered safe for illuminating purposes which will give off an inflammable vapor at the highest temperature reached in lamps. This assumption—based upon experiments—that oils passing this legal test are unsafe. seems to be demonstrated by actual experience collected in tables 2 and 3, which show, both in the city of Detroit and in the whole State, that there was a large increase in the number of casualties from the use of kerosene in 1891 and 1892 over 1890, and that as regards 1891 this was caused by the increase in the number which occurred in the last half of that year.

The Legislature of 1893, realizing that illuminating oils which would pass the legal test established by the Legislature of 1891, were unsafe, and a menace to the lives and property of the citizens of the State, enacted a new law (Act 94, Public Acts of 1893), which appeared to, but did not actually re-establish the legal test in force prior to the change in 1891. Instead of requiring the test to be made in a "State Board of Health Tester," the law requires it to be made with a patent tester, through which a current of air is caused to pass, over a lighted taper, thus distilling off vapor so gradually that the oil does not flash at as low a temperature as the same oil would in a "State Board of Health Tester."

Section 2 of this law, which became operative July 1, 1893, reads as follows:—

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*Published in the First Annual Report (1873), of the Secretary of the Michigan State Board of Health, pages 44 and 45.

†First Annual Report (1873), of the Secretary of the Michigan State Board of Health, page 55.

"SEC. 2. The State Inspector provided for in this act is hereby empowered to appoint a suitable number of deputies: *Provided*, That the number of said deputies so appointed shall not exceed twenty-two, which deputies are hereby empowered to perform the duties of inspection and shall be liable to the same penalties as the State Inspector: *Provided*, That the State Inspector may remove any of said deputies for reasonable cause. It shall be the duty of the inspector and his deputies to provide themselves at their own expense with the necessary instruments and apparatus for testing the quality of said illuminating oils, and when called upon for that purpose to promptly inspect all oils hereinbefore mentioned, and to reject for illuminating purposes all oils which will emit a combustible vapor at a temperature of one hundred and twenty degrees of Fahrenheit's thermometer: *Provided*, The quantity of oil used in the flash test shall not be less than half pint. The oil tester adopted shall be the Foster automatic tester cup, with a lighted wick placed inside the tube, and under the thimble which shall be used by the inspector and his deputies."

In considering the effect of the legal test of kerosene on the number of casualties resulting therefrom, it is noticeable, as shown in Table 2 of this article, there has been a decrease of casualties since the present law went into operation; still the number of casualties in 1894 is greater than it was in the years before the test was lowered in 1891. This may be due to the fact that the tester cup used in 1889 and 1890 required a higher grade kerosene to pass the test of 120 degrees Fah. than does the Foster cup now in use. The present test of 120° F. by the Foster cup permits the use of kerosene which tested by the old, State Board of Health tester would flash at several degrees below 120° F.

Notwithstanding that the "Foster Cup" is still in use as the legal tester, it is gratifying to note, as shown in Table 2, that the reported number of casualties in 1895, is less than in any year in the period (1889–95) which the table covers.

PERSONAL INJURIES CONSEQUENT ON THE USE OF KEROSENE.

The following extracts from correspondence of this office, and from newspaper items, which came to the notice of the Secretary of this Board, give in detail the circumstances connected with some of the casualties from the use of kerosene, which resulted in loss of human life and other personal injuries to citizens of this State in 1893:—

A Woman fatally, and Man severely burned in Menominee City.

Relative to a casualty caused by explosion of kerosene in Menominee city, John F. Hicks, the health officer of the city, wrote to the Secretary of this Board as follows:—

"In reply to yours of 27th ult., regarding the explosion of a lamp in the house of Mr. Angus F. McGillis of this city, I will say there was an explosion, there was a fire, damage to house about $400.00. The explosion was caused by the fall of a lamp on the evening of Nov. 24th. Mrs. McGillis died Nov. 28th. Mr. McGillis is recovering. Mrs. McGillis was assisting in preparing supper and standing near the cook stove. The lamp stood on the kitchen table. A young daughter 14 years old stood near the table and in turning around struck the lamp with her elbow, knocking it off the table. The oil at once exploded immediately filling the room with flame. A son 19 years old was in the adjoining room, heard the fall and explosion, rushed to open the door, room was filled with flame, rescued his sister. Mr. McGillis was also in next room and in trying to save his wife was seriously burned. I have secured a little over half pint of the oil, but have no way of testing it not having an oil tester. As I understand it our oil inspector lives at Ishpeming, and comes here when sent for by the oil dealers (wholesale) and inspects the oil in car load lots, etc I will write to him today concerning the matter. I think it would be a nice thing for me to recommend the city council to supply the health officer with an oil tester. What do they cost and where can I procure one?"

Dec. 10, in reply to Dr. Hicks' letter, the Secretary wrote:—

"Please accept cordial thanks for your letter of Dec. 7, relative to the fire caused by the use of kerosene at the residence of Angus McGillis. I am glad to have such a complete report.

"It would be interesting to know whether or not the oil used would come up to the Michigan standard. If you cannot promptly secure an examination, and will send the sample you have to me by express, I will endeavor to make a test. A half pint will be rather a small quantity, but I think it can be tested.

"I do not know just what an oil tester is worth, I think about five dollars for the present legal tester—the 'Foster Cup'. Apply to Hawkins & Co., Mftrs. of 'Foster Oil Tester', Cincinnati, Ohio. It may cost a little more than five dollars."

Carelessness in the Use of Kerosene.

Although some of the casualties included in the foregoing lists and tables, were no doubt the result of carelessness, and might have occurred with the safest quality of oil; there are others, attended with circumstances which make it probable that the oil used was of a lighter grade than a safe illuminating oil should be.

In the Annual Reports of the Secretary of this Board for the years 1894 and 1895 attention was called to some dangerous practices in connection with the use of kerosene in 1893. It is deemed advisable to repeat the warnings previously given, in the hope that by avoidance of such practices casualties may in future be prevented:—(1) It is dangerous to leave small children alone in a room with a lighted lamp. (2) A burning lamp is most dangerous when the wick is turned down so as to emit only a small flame, because then the top of the lamp is very much heated. (3) A burning lamp without a chimney, or with a broken chimney, is dangerous, for the reason just stated. Experiments have proved that in fifteen minutes a burning lamp without a chimney or with a broken chimney is usually in a condition involving danger of explosion. (4) It is *exceedingly* dangerous to attempt to kindle, or rekindle, a fire with kerosene.

INJURIES AND LOSS OF LIFE AND PROPERTY ALLEGED TO HAVE BEEN CAUSED BY THE USE OF GASOLINE IN MICHIGAN IN 1895.

In 1895, as in former years, an effort was made, at the Office of the Secretary of the State Board of Health, to collect facts respecting every casualty attributed to the use of gasoline, in Michigan, which came to notice. During the year there were received at the Office of the Secretary of the Board reports of 45 casualties in 4 different parts of the State, alleged to have been caused by gasoline, with attendant losses of life and property, and personal injury as follows:—One person fatally, and two persons more or less severely injured; damage to property to the amount of $16,468.

The amount of pecuniary loss was not reported in 1 of the above-mentioned 45 casualties.

TABLE 1.—*Casualties in Michigan during the year 1895, believed to have been consequent on the use of Gasoline, information of which was received at the Office of the Secretary of the State Board of Health.*

	Number of Casualties.	Number of Localities.	Pecuniary losses, Dollars.	Lives lost.	Persons injured (not fatally).
In Detroit	42	1	11,468	1	0
In State (outside Detroit)	3	3	5,000	0	2
Totals in Michigan	45	4	16,468	1	2

Of the 45 reported casualties from the use of gasoline during the year 1895, 8 were attributed to stove explosions, 31 to leaking or overflowing stoves, and 6 to carelessness in handling gasoline, and various other causes.

The Source of Danger in the use of Gasoline.

The special source of danger in the use of gasoline, is its ready vaporization at low temperatures. When exposed to the air, gasoline evaporates quickly, its vapor mixes with the air, and therewith forms an explosive mixture which readily ignites when it comes in contact with a flame or other sufficient cause. This property of gasoline renders it more dangerous than is gunpowder. Some of the casualties reported, were undoubtedly the result of ignorance, or disregard, of these facts.

Below are given details relative to reported casualties. The correctness of the details has been confirmed by health officers or other officials of the localities where the casualties occurred except in the case of the reported casuality in Midland, relative to which the following paragraph appeared in the Detroit Journal of Dec. 19, 1895:—

> "The explosion of a gasoline tank in the Wells-Stone mercantile company store at Midland, yesterday caused $2,000 damages and broke both of Plumber James Donahue's legs."

On receipt of the above information, the usual letter of enquiry was sent from this Office to the health officer of Midland city, but no reply was received from that official.

WOMAN FATALLY BURNED BY GASOLINE IN DETROIT.

Relative to this casualty, the Fire Marshal of Detroit reported substantitally that in a fire, at 228 Hastings street, caused by the over-flow, and ignition, of gasoline from a stove, Mrs. Emma Donnelly, aged 29, was fatally burned.

WOMAN SEVERELY BURNED BY GASOLINE IN JONESVILLE VILLAGE.

Relative to a casualty from the use of gasoline in Jonesville village, Hillsdale county, the health officer of the village wrote:—

"In reply to yours of the 2nd inst., I will say. That in regard to the accident of Mrs. Charles Mercanlailor, of June 5th, 1895, there was an explosion. It was and is a gasoline stove. The trouble was caused by a want of free passage from the gasoline tank above to the burner below. Mrs. M—— was trying to light up, and the rod when ordinarily turned, did not feed sufficiently; and so she continued to turn it until the flow was satisfactory, and the blaze to suit her. She then went into the adjoining room supposing it all right. She soon looked back to the stove; the gasoline had overflowed and the whole apparatus, from burner to tank, were in a flame. She ran and thrust her hand and arm through the blaze in order to turn off the supply. Whether she turned it off or on, or at all, she cannot tell, as her hand and arm to above the elbow were so suddenly and badly burned. She probably could not have told whether she turned it or not. The flames filled the room half full in a few moments, and she escaped to a near neighbor's house; at about which time the explosion occurred blowing the tank to fragments. A large number of citizens rushed in, the fire department is close by and the fire was soon extinguished. The wood work and walls of the room were badly damaged. The arm and hand of Mrs. M—— were badly burned and was attended by myself—is now well, in good shape and order.

"The stove is quite large (3 burners or more). Was manufactured by the firm G. M. Clark & Co., Chicago, Ill.

"My opinion is that there was a mote (possibly in the gasoline itself), that partly obstructed the flow at her first turning on. Whether there is any filtering arrangment in the pipe leading to the burner or elsewhere I do not know; but *surely* every stove should be so arranged as to avoid all such obstructions to the gasoline."

FIRE CAUSED BY GASOLINE IN CHELSEA VILLAGE.

The Detroit Journal of Aug. 5, 1895, contained the following:—

"Chelsea, Mich., Aug. 5.—The residence of R. A. Snyder, a leading business man was burned together with nearly all its contents Saturday night. The fire caught from a gasoline stove. Loss, $2,600; insurance, $2,000.

Relative to this casualty the health officer of the village stated that the above newspaper report was substantially correct; but that the estimated damage was about $3,000.

ALLEGED NUISANCES IN MICHIGAN IN 1895.

During the year 1895, communications relative to 60 alleged nuisances, were received at the office of the State Board of Health, from fifty-eight localities in Michigan.

The causes to which the alleged nuisances mentioned in these communications were attributed, may be classified as follows:

Hog pens, cattle yards, stables, etc., 8; slaughtering and slaughter houses, 10; unsanitary conditions of premises, 5; low lands and marshes, 2; sawdust in river, 1; dead animals, 5; dams in rivers, mill ponds, etc., 5; rags, 1; privies, cess-pools, etc., 7; rubbish in an old well, 1; pomace, 1; drains and drainage, 3; disposal of garbage of Detroit, 1; fish offal, 1; nuisances in general, 1; commercial fertilizers, 1; contamination of water-supply, 3; Detroit sanitary works, 1; cemeteries, 1; sidewalks, 1; diseased cow running at large, 1.

Whenever complaint of an alleged nuisance is received at this Office, the president of the local board of health whose duty it is to act, is usually informed of the nature of the nuisance, and is requested to investigate the same. At the same time sections of law, and pamphlet publications of this Board, pertaining to nuisances and to the duties of local boards of health relative thereto, are sent to him, and also to the person making complaint. Two regular forms of letters are used for this purpose, copies of which are here given. The first is sent to the person making complaint of the nuisance, the other is sent to the president of the board of health of the locality where the nuisance is reported to exist.

STATE BOARD OF HEALTH, MICHIGAN.
OFFICE OF THE SECRETARY.
Lansing.

Section 1640, Howell's Statutes, requires the local board of health to examine into all nuisances, sources of filth, and causes of sickness which may, in their opinion, be injurious to the health of the inhabitants, and destroy, remove, or prevent the same as the case may require.

Section 7965, Howell's Statutes, gives the circuit court *equity* jurisdiction in all matters concerning nuisances where there is not a *plain*, *adequate* and *complete* remedy at law; and authorizes the court to grant injunctions to stay or prevent nuisances. If the court is not in session, application should be made to the circuit judge.

If the Local Board of Health refuses or neglects to make the proper complaint for the abatement of a nuisance injurious to health, any person injured or annoyed thereby may make complaint and prosecute a suit for the abatement of the nuisance as a public nuisance, or for damages by reason of the nuisance as a private nuisance, and for the abatement of the same.

Herewith I send you our pamphlet, "Work of Health Officers and Local Boards of Health in Michigan," on pages 10 and 11 of which are paragraphs bearing on the subject of nuisances, and I send you also some other pamphlet publications of this office bearing on the same subject.

I have not asked the attention of the president of the Local Board of Health to this subject. If this office can be of any further service to you in this case, it will give me pleasure.

Herewith I enclose a stamped envelope, and after reasonable time I shall be glad to learn what is done to abate the alleged nuisance, and with what result.

Very respectfully,

Secretary.

STATE BOARD OF HEALTH, MICHIGAN.
OFFICE OF THE SECRETARY.
Lansing.

President of the Board of Health.

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Herewith I send you our pamphlet. "Work of Health Officers and Local Boards of Health in Michigan," on pages 9 and 10 of which are paragraphs bearing on the subject of nuisances, and some other pamphlet publications of this Office bearing on the same subject.

I shall be glad to be informed whether or not, on examination, this alleged nuisance proves to be a nuisance, and, if it is, what measures are taken for its removal or abatement, and with what result. For this purpose a stamped envelope is herewith enclosed.

Very respectfully,
Secretary.

As compared with the preceding year, there was an increase of eighteen in the number of nuisances reported to this Office in 1895.

In articles on alleged nuisances, published in previous Annual Reports of this Board, attention was called to the fact that a large proportion of the communications received at this Office in regard to alleged nuisances came from local health officers and other township, city and village officials, asking for information relative to points of law concerning nuisances, or requesting advice as to their duties, or to the proper legal procedure necessary to effect the prevention or abatement of nuisances. The correspondence of 1895, shows a desire on the part of the local health officials for advice and coöperation of this Board, which has been freely and cheerfully given, and it is believed, with beneficial results to the public health.

The State Board of Health has no authority to enforce or order the abatement of a nuisance. Its powers in this respect are advisory. And while the Board is willing to render such advice as it may be able to give on any subject, it is often the case in regard to nuisances that prosecuting attorneys, or other lawyers, on the ground and acquainted with the facts, are in better position to give legal advice than is the State Board of Health. The State Board of Health is always glad to learn of the efforts of local boards to abate nuisances, and what success attends those efforts; and solicits correspondence upon this subject. It cannot, however, undertake to do for local boards that which the law has so well provided for their doing for themselves. In showing them how they can help themselves it really does more for them than to do their work; for when the local board has mastered the situation and removed a nuisance, it has secured a vantage ground which a distant authority could not so well secure and hold.

The following extracts from the correspondence of this Office relative to the above-mentioned alleged nuisances in 1895, show the nature of some of those nuisances, and the action taken and recommended to be taken in regard to them by the Secretary of this Board.

Hog-pen in Holly Village an Alleged Nuisance.

May 30, 1895, a resident of Holly village, Oakland county, wrote to the Secretary of this Board making complaint substantially as follows:—That a hog-pen about 12 feet square, in which seven hogs were kept, was maintained within 60 feet of her residence, that the stench therefrom was unbearable, that the owner of said pen refused to remove it, and that although application for its removal had been made to the health officer of the village, no steps had been taken to abate the nuisance.

By letter dated June 3, 1895, the Secretary communicated the substance of the above-mentioned complaint to the president of the local board of health who replied that the case would be "properly attended to."

June 6, 1895, the complainant in this case again wrote to the Secretary stating that the nuisance had been abated.

Hog-pen in Caledonia Village an Alleged Nuisance.

July 1, 1895, a resident of the village of Caledonia, Kent county, wrote to this Board as follows:—

"This is an incorporated village of over four hundred inhabitants, and in the midst of the business portion and dwellings is kept a pen of hogs varying in number from one hundred and fifty, sometimes more sometimes less. They have been kept there since last October, at one time as many as two hundred and fifty. In May a petition was presented to the village council to have it removed. They referred it to the health officer and there it rests."

July 2, the Secretary of this Board wrote to the president of the board of health of Caledonia informing him of the complaint made, also sending him copies of sections 1640 and 7965 Howell's Statutes, and pamphlet publications of this Board bearing on the duties of local boards of health relative to the abatement of nuisances. At the same time similar documents were sent to the complainant.

Aug. 12, the complainant again wrote to the Secretary stating that nothing had been done to abate said nuisance.

Aug. 14, the Secretary wrote as follows to Alfred Wolcott, Prosecuting Attorney of Kent county:—

"On July 2, complaint reached this Office of an alleged nuisance consisting of a hog-pen in the center of the village of Caledonia, where there are kept many hogs, and that it causes a bad odor which may be dangerous to the public health. I immediately wrote to the President of the Village calling his attention to section 1640, Howell's Statutes, which requires the local board of health to examine into all nuisances, sources of filth, and causes of sickness that may, in their opinion, be injurious to the health of the inhabitants, and destroy, remove, or prevent the same as the case may require.

"No response has been received from the President of the village. A letter has just been received from the complainant dated August 12 saying that nothing has been done to abate the nuisance.—'Meanwhile the surrounding neighborhood consisting of eight families besides business houses have to live this hot weather with closed doors and windows night and day.'

"Herewith I send you a blank form which I used in the letter to the President of the village.

"I trust that you may take some action which will induce the local board of health to abate this nuisance, if it proves to be a nuisance as it is alleged."

Aug. 15, 1895, in reply to the Secretary's letter, Mr. Wolcott wrote:—

"I have yours of 14 relative to alleged nuisance at Caledonia. No complaint has been made at this office. I have however taken steps today to have the matter called to the attention of the local board of health, and investigated, and I think if such nuisance exists that it will receive attention."

Cattle Yard in Buchanan Village an Alleged Nuisance.

Aug. 1, 1895, Dr. H. M. Brodrick, health officer of Buchanan village, Berrien county, wrote to the Secretary of this Board as follows:—

"The by-laws or rather ordinances of our town prohibit the use or keeping of any yard for the purpose of feeding any 'cattle' to be slaughtered or shipped for market 'within' the limits of the village. Complaint has been made to me, last year as well as this, that one of these yards, near the R. R. grounds was so offensive that some of the people in the neighborhood cannot stand it, are obliged to shut down windows and doors while eating. The owner of this yard has been notified to discontinue. He refuses to do so as it is his own private property and will use it. At the same time maintaining that there is no offensive smell to it as he keeps it clean and as it has a natural drainage. When it rains he claims it cleanses itself; while the complainants say that after a rain or when the weather is close or murky, the stench is intolerable. The ordinance provides, 'he shall be fined not exceeding $25 and costs.' The point with me is, if this be a nuisance or is detrimental to health, what would become of the nuisance while the law was trying the offender, and while he was appealing the case. If the nuisance had caused one case of disease before the trial how many would it cause during the trial and before its settlement. Again, is it right to have a dam on a small stream in the center of the town into which all the filth of those adjacent thereto [is thrown], and allowing the water to run so low as to make it offensive, to say the least. We have such a case here. If you can give me any information on these points you will oblige. What further should I do in these cases?"

In reply to Dr. Brodrick's letter, the Secretary wrote, Aug. 1, 1895:—

"Your letter of August 1, relative to an alleged nuisance in the village of Buchanan is before me, for which please accept thanks.

"Permit me to call your attention to the following:—Sections 1640, 1641, 1642, 1643, 1644 and 1645 of Howell's Statutes. It seems to me that your question is answerable by sec. 1645, in which provision is made for immediate abatement of a nuisance. And in sec. 1640 it is distinctly stated that it is the opinion of *members of the board*, not of the complainant nor of the defendant.

"As to the dam or stream in your town, I am not clear that the removal of the dam would improve the conditions. Perhaps you have omitted to mention some of the items which were needed to form an opinion."

At the same time (Aug. 1.) the Secretary wrote to the president of the village board of health, informing him of the complaint made relative to this alleged nuisance, and asking his attention to the subject.

Alleged Nuisance in Pierson Village.

Aug. 13, 1895, Dr. James Plank, health officer of Pierson village, Montcalm county, wrote to the Secretary of this Board stating that a nuisance existed in his jurisdiction; said nuisance consisting of a foul water tank in a livery barn, and asking what he should do to effect its abatement.

The Secretary gave Dr. Plank the information asked for and the nuisance was abated.

Hog and Cattle yard in Bronson Village an Alleged Nuisance.

Dec. 21, 1895, John E. Outwater, M. D., health officer of Bronson village, Branch county, wrote to the Secretary of this Board as follows, relative to a nuisance in his jurisdiction:—

"A complaint has been made to me regarding a hog and cattle yard in this village. The yard is owned by a wealthy man. * * *. The complaint was made by his nearest neighbor * * *. I saw Mr. A—— [the owner of the yard] and advised him to remove the cause of complaint a number of weeks ago. He refuses to do so. I referred the matter to the President of our village Board. He in turn called on the other members of the Board who, with the exception of two other members, refuse to even investigate the cause of complaint, saying they do not wish to get into trouble with their neighbors. Now what are we going to do? The yard is within 11 feet of Mr. ——'s back door and is full of filth, which, during the present wet weather is very offensive to the smell. In fact it is just what any yard which has been used for such purposes for years, always is. What we would like to know is, how can the Board be compelled to act far enough to see whether a thing reported as a nuisance is so or not. The President and myself have examined it and find it filthy. The other members with two exceptions utterly refuse to even look at the yard, or to uphold any measures we may take to remove it, and we do not feel like taking the full responsibility upon ourselves of what will surely terminate in a law suit as Mr. D—— says the yard must be cleaned out and kept so if there is any law to do it."

Dec. 26, the Secretary replied as follows to Dr. Outwater's letter:—

"Your letter of Dec. 21. relative to a nuisance in your village, is before me. The local *board* of health should examine into the complaint of the nuisance at the cattle yard of Mr. A——; if a nuisance is found, it should be ordered immediately abated. It would seem from your letter that Mr. A—'s cattle yard is a nuisance. The village council is the board of health, where special provision has not been made."

With the above letter, the usual documents bearing on the subject of nuisances, and the duties of local boards of health relative thereto, were sent to Dr. Outwater.

Chickens killed at Meat Market in Plymouth Village an Alleged Nuisance.

Jan. 4, 1895, a resident of Plymouth village, Wayne county, wrote to this Board relative to an alleged nuisance in said village, substantially as follows:—

"I am living within 12 feet of a meat market in the village of Plymouth where the owner of a butcher shop kills all his fowls for his market, either in the cellar under the butcher shop, or in the back room adjoining the sales room of the meat market; and when he cleans out the room, sweeps the bloody water out the door on the ground, lets the feathers and entrails of the fowls stand in barrels outside the shop at the back door until convenient, or he sees proper to take them away; and last summer stored fowls in a large chicken crate within 14 feet of my kitchen window, in hot weather, until the odor from same was almost unbearable, rendering lard and tallow in the market, etc., etc. We have appealed to village council and they in turn have referred it to the health officer, who reports no nuisance. Yet while the President of our village himself acknowledges that the village council says the law says they have no right to slaughter within 200 feet of a public highway, he does not stop the slaughtering on the premises occupied by the meat market. Will you tell me how the State law would deal with what I would term a slaughter yard so near a residence and right in the business part of the village?" * * *.

Jan. 7, 1895, the Secretary replied to complainant's letter as follows:—

"Replying to your complaint of Jan. 4, relative to an alleged nuisance in the village of Plymouth, where there is an offensive butcher shop only 12 feet away from your house, where they do butchering, rendering, etc., I would respectfully call your attention to sections 1682 and 1683 of Howell's Statutes. Section 1682 provides: 'No person shall keep or maintain any slaughter house, slaughter-yard, or slaughter pen, or any other place for slaughtering, butchering or killing any animals, or rendering dead animals as a business, within twenty rods of any public highway within this State.'"

With the last-quoted letter, copies of sections of laws, and pamphlet publications of this Board, bearing on the subject of nuisances and their abatement, were sent to the complainant.

On the same date (Jan. 7) the president of the village board of health was informed of the complaint made, and his attention was requested to the matter, and documents were sent to him similar to those sent to the complainant.

Jan. 15, 1895, Geo. W. Hunter, President of Plymouth board of health replied to the Secretary's letter as follows:—

"Yours relative to nuisance adjoining Mrs. A. M. Potter's residence came duly to hand. Neither myself nor our health officer, J. M. Collier, are able to find any nuisance existing on said premises. This matter has been a source of annoyance to us for two years past and every complaint has received prompt and careful attention, and the result attained leads us to suspect that personal motives actuate Mr. and Mrs. Potter in making a crusade against Mr. C. F. Bennett, the proprietor of the market in question, which by the way, is conducted in as clean and wholesome manner as any market within our observation. * * * Could you do so conveniently we would be pleased to have some member of your board call upon us unawares and see for himself."

Old Horses Slaughtered and fed to Hogs in Sylvan Tp. an Alleged Nuisance.

Feb. 18, 1895, residents of the unincorporated village of Sylvan, Washtenaw county, complained to the Secretary of this Board, that a man in said village had been extensively engaged the past two years in slaughtering old horses, feeding their flesh to his hogs, and allowing the carcasses to lay around on the surface of the ground without any cover; and that the stench arising from these conditions was a nuisance. The complainants further stated that the health officer had been notified two or three times of this nuisance, but had done nothing to abate it.

Feb. 18, the Secretary wrote to the president of the local board of health advising him of the complaint made, and requesting that if a nuisance existed, as represented, it be abated.

Feb. 25, Hiram Lighthall, supervisor of Sylvan township, replied to the Secretary's letter as follows:—

"I know that Mr. W. slaughtered some old horses one year ago, and is also engaged in doing it now but to no great extent. I have never heard complaints from his neighbors or others claiming it to be a nuisance; but I will investigate and take necessary steps to abate the nuisance if such it proves to be."

Slaughter Houses in Wyandotte City.

March 18, 1895, N. T. Langlois, M. D. health officer of Wyandotte, wrote to the Secretary of this Board as follows, for information relative to slaughter houses:—

"I am seeking information as to the most efficient and proper method to take hold of the slaughter house problem. These establishments are carried on in the heart of our city contrary to our city ordinance but it is next to impossible to get the ordinance enforced. Is there a State law that would cover this point, or does the local law cover it sufficiently? Complaints have been made to me and I have investigated and ordered the marshal to prohibit future slaughtering; but this amounts to nothing. Kindly give me an outline of a mode of procedure so I can go at this matter properly."

In reply to Dr. Langlois' letter, the Secretary wrote March 19:—

"Your letter of March 18 relative to the slaughter house in Wyandotte * * * *, is received.

"Relative to the slaughter house in Wyandotte, section 1682 of Howell's Statutes makes it a misdemeanor for any 'person to keep or maintain any slaughter-house, slaughter-yard or slaughter-pen, or any other place for slaughtering, [butchering] or killing any animals, or rendering dead animals as a business, within twenty rods of any public highway within this State, or in any other place.' Section 1683 provides the penalty."

Pamphlet publications of this Board bearing upon this subject were also sent to Dr. Langlois.

Slaughter Houses in Laingsburg Village an Alleged Nuisance.

May 14, 1895, C. M. Freeman, M. D., health officer of Laingsburg, wrote to the Secretary of this Board stating that slaughter houses within the corporate limits of that village, but twenty rods from the road, were complained of as a nuisance by reason of offensive odors arising therefrom; and asking if the owners of said slaughter houses could be compelled to move them further away.

In reply to Dr. Freeman's letter, he was written to from this Office that "Section 1682 Howell's Statutes provides that no slaughter house shall be within twenty rods of any public highway." Documents published by this Board bearing on this subject were also sent to Dr. Freeman.

Slaughter Houses in Newburg Township an Alleged Nuisance.

June 5, 1895, G. A. Hughes, M. D., health officer of Newburg township, Cass county, wrote to this Office as follows, relative to an alleged nuisance in his jurisdiction, said alleged nuisance being situated in the unincorporated village of Jones:—

> "In our little town, located side by side on the main street are situated the Post Office and meat market. In the back room of market calves are slaughtered. Not only calves but sheep and sometimes hogs. The building stands about 4 feet from the ground. The fluid waste runs through on to the ground, etc., etc. Old tallow and fat of different kinds are tried out there, filling the air with unpleasant odors, etc. Our town is not incorporated. I have asked them to discontinue but they continue. What is the proper course to pursue? Please give me the necessary instruction and information."

In reply to Dr. Hughes' letter, he was informed that Section 1682 Howell's Statutes provides that "No person shall keep or maintain any slaughter house, slaughter-yard or slaughter-pen, or any other place for slaughtering, [butchering] or killing any animals, or rendering dead animals as a business, within twenty rods of any public highway in this State."

Slaughter House in Colon Township an Alleged Nuisance.

Aug. 17, 1895, a resident of the unincorporated village of Colon, Colon township, St. Joseph county, wrote to this Office stating that a slaughter house was maintained in that village within fifteen or twenty rods of dwelling houses.

On receipt of the above-mentioned information the usual letter and documents relative to nuisances, were sent to the president of the local board of health. Sept. 2, information was received that the said nuisance had been abated.

Old Slaughter House in Owosso an Alleged Nuisance.

Sept. 9, 1895, a resident of Owosso wrote to the Secretary of this Board as follows, relative to an alleged nuisance in that city:—

> "Just outside of the limits of this city exists a horrible pestilence. The stench from an old slaughter house and piggery, owned by one C——, is beyond description, and it is almost impossible for people to exist within a radius of 80 to 100 rods of the pestilential *upas*. The stench at this writing is awful and you can have no conception of the torment inflicted upon the people by this breeder of *worse* than *death*. Chinese 'Stink Pots' would be mild in their effects compared with the baneful ravages of the deadly vapors arising from offal which is left exposed to the rays of the sun and is being stirred up by a lot of hogs, the pork of which may, not long hence, find its way to your table or mine. * * * * * Now, my dear sir will you waive all formality and come up here at once? If not in your official capacity come as a private citizen and verify my statements, I will pay you for your trouble, if you will come at once."

In reply to the above-quoted letter, the Secretary wrote, Sept. 10, as follows:—

"Your letter of Sept. 9, relative to a slaughter-house and piggery * * * just outside the city limits of Owosso, is received. It will be impracticable for me to come to Owosso, and I can not see how it will help you materially, as this is a subject entirely in the hands of the local board of health. You do not state in what township the slaughter-house is, or I would call the attention of the supervisor to the subject. The supervisor is president of the board of health.

"From your description I would think there was no question about it being a nuisance.

"Section 1682 Howell's Statutes provides that 'no person shall keep or maintain any slaughter-house, slaughter-yard or slaughter pen, or any other place for slaughter, [butchering] or killing any animals, or rendering dead animals as a business, within twenty rods of any public highway within this State, or in any other place, except as provided' in section 1678 of Howell's which makes it the duty of the local board of health of the township to 'assign certain places for the exercising of any trade or employment offensive to the inhabitants or dangerous to the public health and they shall forbid the exercise thereof in places not so assigned.'"

UNSANITARY CONDITIONS OF PREMISES ALLEGED NUISANCES.

Unsanitary condition of Court House at Saginaw an Alleged Nuisance.

Feb. 22, 1895, Dr. H. Williams, of Saginaw city, wrote to the Secretary of this Board as follows:—

"The Board of Health have been asked to investigate the sanitary condition of our Court House. We have not done so yet but will at an early date. We wish to make a full and complete report and would like to employ an expert who can present facts in a way that the county supervisors will have no reason to doubt the necessity for improvements to the building. The building has settled and openings exist allowing sewer gas to enter the ventilating flues; and sewer traps are defective and the ventilating system is very defective, and to one who understands the first principles of hygiene the necessity for a change would be evident at once; so if you can suggest some one who can assist us in bringing convincing proof by qualitative and quantitative tests we will be greatly obliged."

In reply to Dr. Williams' letter, Feb. 23, 1895, the Secretary wrote:—

"Replying to your letter of Feb. 22, relative to a sanitary expert, I do not know that I can recommend one to you, unless it might be a Mr. Thos. S. Ainge, at Michigan Central Freight Office, Detroit, a copy of a list of whose qualifications I send herewith. I have not had the pleasure of meeting this gentleman. He is an applicant for a position in this Office, and sent me the enclosed qualifications. He may be the person for whom you are looking, and you can judge for yourself. Will you kindly return the qualifications.

"I presume it might be possible for him to obtain leave of absence from his present position long enough to make the investigation you need."

Mr. Ainge was employed, made the investigation, a small appropriation was made by the board of supervisors, and some of the most urgent improvements were made.

Rotten Potatoes in Pierson Village an Alleged Nuisance.

May 8, 1895, James Plank, M. D., health officer of Pierson village, Montcalm county, wrote to the Secretary of this Board stating that a load of rotten potatoes had been dumped in the street of that village, and that the owner of said potatoes refused to remove them.

The Secretary informed Dr. Plank of the proper legal procedure to effect abatement of the nuisance.

Filthy old Store and Foul Well in Grandville Village an Alleged Nuisance.

Oct. 17, 1895, O. C. Taylor, president of Grandville village, Kent county, wrote to the Secretary of this Board asking advice relative to a filthy old store and well in said village which were supposed to have caused typhoid fever, and were a nuisance.

The Secretary's reply to that part of Mr. Taylor's letter which referred to the nuisance was as follows:—

"If necessary, the board might declare the well a nuisance, dangerous to the public health, and order it abated. If the order is not obeyed action should be taken under the law—§ 1642, Howell's Statutes."

Unsanitary Conditions in Athens Township.

Oct. 18, 1895, Paul S. Fox, health officer of Athens township, Calhoun county, wrote to the Secretary of this Board as follows:—

"There are several cases of fever in this locality, which I believe to be typhoid. In a family east of town there are three ill. Symptoms are now pronounced. I suspect the cause to be the drinking water from shallow drive wells. There is a case in this village [unincorporated village of Athens]—a boy about twelve years of age. I attribute the cause to unsanitary surroundings. Please send me full instructions and literature on typhoid fever, as none are at present in the health office, also explicit instructions as to how to proceed in making people clean up. How to condemn wells and get the people to using better water. Every householder imagines his water is the best in the world."

Oct. 19, in reply the Secretary wrote:—

"Replying to your request of Oct. 18, relative to instructions to make people clean up, how to condemn wells and get people to using better water,—Your board might issue general regulations acting in accordance with sections 1636 and 1639 Howell's Statutes and framing and publishing rules and regulations; or in special cases of filthiness, your board should declare them nuisances and order them abated. If the local board of health has good reason to believe that any well is dangerous to the public health, the board should declare it a nuisance, and order it abated. Perhaps the best way to abate a well nuisance, is to fill that well with good clean earth.

"In another communication I have replied to that portion of your letter relative to typhoid fever."

Defective Heating and Ventilating Apparatus in School House a Nuisance.

Information having been received by the Secretary of this Board that the heating and ventilating apparatus in the school house in District No. 5, township of Delta, was a nuisance and detrimental to public health, mainly through the delivery of smoke into the school; the Secretary wrote to the Supervisor of the township, and to Mr. George Wall, Director of school District No. 5, calling their attention to the matter.

Dec. 26, Mr. Wall called at this Office (in the absence of the Secretary) to explain the alleged nuisance in the school house where the smoke and gas from the furnace came into the room, and were alleged to be dangerous to the health of the pupils. He said that the trouble came from the smoke flue being too small to give a good draught. The furnace is a Smead make, burning wood and coal "at the same time." He said that the district had been going to remedy the trouble by making the smoke flue larger by about one-third, which it was thought would give ample draught; and since so much trouble had been made, the district board had decided to fix the flue at the first opportunity—when the weather was favorable. Mr. Wall was told that the law made it the duty of the local board of health to abate nuisances, and that he had better consult with the local board of health, or at least the supervisor who is the president of the board. He said he would consult with Mr. Dann the supervisor immediately and would then call or write to this Office. He requested that the subject should be placed before the Secretary as soon as practicable, and that the Secretary write to him (Mr. Wall) giving his opinion whether he thought a continuous smell of smoke or gas, although very slight, would be dangerous to the health of the occupants of the school room. Mr. Wall said this had been the situation for three or four years.

In compliance with Mr. Wall's request, the Secretary wrote to him, Dec. 27, 1895, as follows:—

"I am sorry not to have seen you when you called yesterday, but I was busy with a meeting of the State Academy of Science. However, I think most of the points were placed before me, upon my return, and I will endeavor to give my opinion to the question you ask.

"I think any smell of gas or smoke, however slight, if it were continuous, would be likely to injure the health of any person (especially a child) being obliged to inhale such smoke or gas. The gas from coal is dangerous and should certainly not be permitted in any house or school room. While a small amount of coal gas may not have any immediate noticeable bad effect upon the school children, I have no doubt that it is a slow way of poisoning, and would, I believe, have much to do with the future health of any child. The smoke from the furnace not only irritates the lungs and eyes, but would certainly be dangerous for any person to continuously breathe it. Then carbonic acid gas is deadly, and carbonic oxide still more deadly, and these have no odor.

"I think the situation you describe is very bad and dangerous to the health of your school children, and should be immediately remedied.

"If this office can be of further service to you, it will give me pleasure."

Dec. 30, the Secretary again wrote to Mr. Wall as follows:—

"Relative to the heating and ventilation of the school house, permit me to recommend that the register in the floor between the school room and the cold-air chamber should be removed, and the opening closed. I think it would be well if the cold air supplied to the furnace be taken directly from the outside air, and not from the cold-air chamber as heretofore. This can be done by an air-tight pipe leading from the present cold-air inlet to the wall of the present cold-air chamber where it will connect with the pipe leading to the furnace.

"The flue in the chimney for the smoke should probably be 12 inches in diameter if circular, or about 10 by 16 if oblong, and should be smooth inside.

"To supply the proper quantity of air to the fifty pupils at such time as the difference between the temperature of the indoor and the outdoor air is not great. The combined area of the foul-air outlets should be about eight square feet. It will be best that the foul air be not all taken out at the same place. If the foul-air flues are several the friction will be more than if all in one, therefore they should be a little larger. Their size being sufficient for mild weather, in extreme cold weather their capacity will need to be decreased, by registers on *some of them at least.*

"Herewith is a plan which will aid in understanding the subject."

Several conferences, in the office of the Secretary of the State Board of Health, were afterwards had with persons living in the School district, and advice was freely given. There were difficulties in the way of securing proper action, especially during the continuance of the school in the cold season of the year.

MARSHES, DAMS, ETC., ALLEGED NUISANCES.

Mill Dam in Hillsdale City an Alleged Nuisance.

In June, 1892, Andrew L. Davis, a resident and ex-supervisor of Jefferson township, Hillsdale county, complained to this Office that a mill-dam in Hillsdale so obstructed the natural drainage of parts of the county as to cause 700 or 800 acres of adjacent land to be submerged in rainy seasons, and that said dam was therefore a nuisance. The action taken at that time relative to the alleged nuisance is described in the article on nuisances, pages 348–50 of the Annual Report of this Board for 1893.

March 2, 1895, the same person reopened the subject by writing to this Office, as follows:—

"I send by mail to-day a full and complete map* of the lowlands and marshes in the northwest corner of the township of Jefferson and which can be effectually drained by the drain as laid down on my map, starting in the north west part of Lake Pleasant and running thence north and east under the Mich. Southern Railroad to a point you will find on the map located on the N. E. ¼, N. E. ¼, Sec. 5, then it strikes a natural creek and runs south again under the M. S. R. R. and empties into Deer Lake. To this point on the N. E., N. E. ¼, section 5, we find 35 feet fall from the Lake Pleasant. But the existing circumstances under which we are embarrassed, are as follows:—

"You will find on my map* at the city of Hillsdale a dam indicated on the map as 'Stock's Dam' and many years ago the water from Baw Beese Lake and Boot Lake run a Custom Grist Mill; but twenty years ago was sold by Cook and Waldron to Mr. Stock, and he immediately changed from a public grist mill to a 'Merchant Flouring Mill' and threw out all custom work and put in a powerful engine and runs his machinery by steam.

"In the year 1846 an attempt was made to drain our lands by this same proposed route and lowering Lake Pleasant sufficiently to do so; but in any high water on the low lands in the southwest corner of the town and around a lake known on the map as McCollum Lake a drain had been made toward Boot Lake and in high water some water would go toward that lake (Boot) and from there to Baw Beese and through a small stream to Hillsdale to help run this custom grist mill which was run by water and when the attempt was made to lower the lake sufficiently to drain our land an injunction was sued out by Cook and Waldron and the court desiring to help a public enterprise and forward a public benefit granted the injunction. As soon as we attempted the proposed drain Mr. Stock took the advantage of that injunction of 1846 and attempted to stop our work but we partially completed the work and lowered the lake from 1 foot to 1½ feet, but to make it complete success should be lowered one more foot and were it not for the citation of Mr. Stock would be immediately pushed to a finish and then nothing but a deluge could prevent us from relieving the people from the foul, rotten miasmatic stench that we have been living in for the last fifty years, but should we have to refill the partial drain we have dug it would be a source of much discouragement to the residents of the south west portion of the township. You will find on the map the cut of a road on the farm of a man by the name of Payne south of Lake Pleasant which did run across some low lands but a part of the road kept sinking till we put into that sink hole nearly or quite $1,000 and then abandoned the road. Another spot on the N. W. corner of section sixteen has kept sinking and overflowing till we have used up more than $1,000, and has been covered within the last two years with more than four feet of water and a danger signal has been kept each side of the hole nearly five months in the year till we lowered lake Pleasant and today after the snow has all melted off and we have had two days' rain, a woman can cross the spot with low shoes on and not soil them, and the same road I drove a load of corn across two years ago and the water ran into my wagon box. To make the map I send you, I traveled ¾ of a day over the marsh publicly known as 'Big Marsh' and after the snow had all melted, and was raining at the time and with shoes on, and my feet were perfectly dry at night. That the map I send you is not overdrawn I can send you the sworn statements of fifty of our best citizens of the township who have the most perfect knowledge of the situation and if you can do anything to aid us in maintaining our rights and relieving ourselves of such a deplorable condition as would surround us in the event of having to stop the water as indicated at the foot of 'Big Marsh' at station 51, it would be most thankfully received I assure you. That an order or recommendation from your Board to lower the lake or drain the land (which cannot be done till Lake Pleasant is lowered) would be a very strong incentive to our court to annul the injunction is a fact beyond all controversy.

"We have had the surveys made by a very competent surveyor and one whose accuracy cannot be questioned and if your authority or official position (State Board) would allow you any dictation in the matter and you desire the actual survey of the whole grounds or desire me to answer any questions before your Board I will be very glad to bring them to you as they are in the hands of the prosecuting attorney (the town's counsel) and he told me he should be very glad to have me take them to you should you desire them. You may ask why Mr. Stock who owns the dam objects to running the water around across the 'Big Marsh' I will say that no sane man can tell. His counsel contends that he wants the water in the race for condensing purposes but I will add right here that the city has water works and a water main runs within thirty feet of his engine and he can procure all the water he desires. Should you desire any further information or any records which we have or could procure, they will be sent at once. Now Gentlemen hoping you may insist on removing the miasmatic conditions you can see must surround us in case Lake Pleasant cannot be, and remain, lowered I will in behalf of the township sincerely thank you for the interest you have thus far exhibited in behalf of the sanitary conditions of the township and would be very glad to know your opinion of the matter as you see it from circumstances and surroundings as you have received them from us (or me) and hope to receive a reply at no distant day."

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*Copy of the map referred to is printed on page 349 of the report of the Secretary of this Board for the year 1893.

March 7, 1895, the Secretary of this Board wrote in reply to Mr. Davis' letter, as follows:—

"Your map and letter containing full and complete description of the low lands and marshes, etc., and how they may be drained, is received, and will receive attention. Please except thanks."

June 5, Mr. Davis again wrote to the Secretary as follows:—

"At your request last spring, in March I think, I sent you a map of the swamp lands in the township of Jefferson and fully explained the necessity of lowering Lake Pleasant, and hoped for some advice from the State Board in relation to the matter.

"Not having any knowledge of what may been your or the Board's opinion in the matter, I send this hoping you will favor me with your reply and also the merits of the matter under consideration, if such map has had your consideration up to this time."

In reply to Mr. Davis' second letter June 10, the Secretary wrote:—

"Your letter of June 5, relative to an alleged nuisance in Jefferson Tp., was received during my absence from the Office for a few days. I have just sent the diagram of the alleged nuisance, to the photo-engravers for engraving and printing in the Annual Report of this Board, in connection with the subject of this alleged nuisance. The material will probably be in shape for me to go over it carefully in a few days, and express an opinion. As long as the subject has already been delayed for sometime, I would prefer to wait a few days when I can have the material before me. If anything should happen that you do not hear from me within two weeks, I hope you will let me know."

July 20, Mr. Davis returned the last quoted letter to this Office, adding thereto the following note:—

"I call your attention to the above as my townsmen are quite anxious to have your opinion of the matter. You have a map and my letter of explanation and if you desire the sworn statement as to the correctness of map and letter, I shall deem it a pleasure to send you the same from a score or more of the best citizens of Jefferson to that effect. All I ask is send me the map and letter or duplicate with the request for the certified statement."

July 20, the Secretary wrote to Mr. Davis as follows:—

"Your note on my letter to you June 10, has been here waiting for several days. I was in hopes to have been able to have sent you the printed material relative to this subject, but as yet the material has not been printed.

"You wish my opinion whether or not I think that the swamp land, alleged to be a nuisance, is really a nuisance. Now that is an opinion I would rather not give, because I have not visited the locality and really do not understand the situation sufficiently to give you my opinion. Then again it is not necessary for you to have my opinion. Your board should act in accordance with Section 1640 Howell's Statutes which requires the local board of health to examine into all nuisances, etc , and destroy, remove or prevent the same as the case may be. Your local board of health has it all in its power, and they should decide whether or not the alleged nuisance is a nuisance.

"My understanding of a nuisance is anything which by its use or its permanent existence works annoyance, harm, inconvenience, or damage to others.

"With the above definition of a nuisance, your local board of health could easily decide whether or not the swamp is a nuisance.

"Section 7965 Howell's Statutes gives the circuit court equity jurisdiction in all matters concerning nuisances where there is *not* a plain, adequate, and complete remedy at law, and authorizes the court to grant injunctions to stay or prevent nuisances. If the court is not in session application should be made to the circuit judge.

"Herewith I send you a pamphlet on pages 10 and 11 of which you will find paragraphs which may be of interest to you."

Aug. 15, 1895, Mr. Davis replied to the Secretary's letter of July 20, as follows:—

"Your note of July 20, in relation to the alleged nuisance of our swamp land in the township came duly to hand and was sorry that your absolute knowledge of the situation prevented your giving a definite opinion in relation thereto.

"But if you can express no definite opinion in the matter without examination, of course the map which I sent you is of no use to you and if you will return the same to me to be used in the contest over the right of continuation of such drain I will remit you stamps for such return and will save me the trouble and expense of making another map. In the meantime we have studied the advisability of subpœnaing you for an examination and evidence of your opinion and decision in relation to such nuisance. As a matter of fact if one man can confine the water upon 700 or 800 acres of land while the summer sun dries the same, with no hope of redress nor no chance of escape, it is very certain and clearly evident that the law creating boards of health is a downright failure.

"The township board of health may declare the matter a public nuisance, which they would at once do, but if they should so declare, they would have to order its removal, but the question is asked how. If they attempt to drain, a party steps in, serves an injunction and the matter remains as a lawyer would say (statu quo). The township board of health would have come to the rescue long since but the trouble is the execution of their order.

"Should you have any advice to offer such will be thankfully received and fully appreciated."

In reply to Mr. Davis' last letter the Secretary wrote, Aug. 19, as follows:—

"Your letter of Aug. 15, is before me. In compliance with your request I send to you the map which you sent to this Office. I have had it carefully redrawn and an engraved plate made for use in the Annual Report of this Board.*

"You say that if one man can confine water upon seven or eight hundred acres of land the law creating boards of health is a failure. It does not seem that way to me, because boards of health have many other duties besides those connected with overflowed lands; and the diseases which cause most deaths in this State have very little known relation to that subject. Where so much is involved as is usually involved where seven or eight hundred acres of land is overflowed, I think the subject should be dealt with by the courts. Permit me to ask your attention to pages 10 and 11 of a pamphlet [120] which I send to you herewith, especially to the paragraph which I have marked on page 11, which embodies the advice which you ask for in the last paragraph of your letter."

Pond and Mill-Dam an Alleged Nuisance.

June 21, 1895, a resident of Middleville village, Barry county, wrote to the Secretary of this Board substantially as follows relative to an alleged nuisance in that village:—

"We have a matter here which should have immediate attention. I enclose a little sketch which will help me to explain. Our little town is suffering from a smell which is terrible, and which is causing lots of sickness. On the sketch you will see that we have a pond surrounded by a high bank on the south, east and north, and on the west by the Michigan Central Rail Road, except by two bridges which allow part of the river to flow into and out of the pond, thus filling the basin with water which, at high-water covers everything, but at low-water leaves very little water in there. Now this is all grown up with cat tails, etc., and when it is not submerged in water, is covered with slime, and at times emits a terribly sickening smell. The mills draw down the water 18 or 20 inches below the dam and then they will allow it to come up again, thus raising and lowering the water in this basin, which I have seen it change from water running over the dam to 18 inches below, in 4 or 5 days; and in this hot weather the smell is very sickening. I myself, feel that my health is being greatly injured, and I have been compelled several times to leave my work and leave the town for the improvement of my health, and there are others in the same shape. Perhaps you will remember Rev. P. G. Robertson speaking to you about the same thing last summer. He has since died, and his wife is, and was, suffering from malarial rheumatism, and others are in the same shape. Now we want the matter looked into. Please let me know how to proceed to get it investigated as the smell on our business street today is terrible."

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* Printed on page 349, Report State Board of Health for 1893.

On receipt of the last-quoted letter, the Secretary wrote, (June 22, 1895) to the president of the board of health of the village, informing him of the complaint made, and asking his attention to the alleged nuisance.

At the same time the Secretary wrote to the complainant as follows:—

"Your letter of June 21, relative to the influence of the pond on the health of the inhabitants of Middleville, is before me. This is a subject to which I have several times given attention, and I take pleasure in pointing out how this nuisance can be abated, if it really is a nuisance, as has been so many times alleged.

"It rests with the people of Middleville whether or not they will continue to endure this nuisance.

"When a nuisance is such that its abatement will involve the destruction of private property; and the owner does not regard the order of the local board of health to abate it, and when the danger to life and health is not so great as to admit of no delay, it is generally the better, as well as the safer course, for the board of health to enter a complaint before a court, and secure a judicial order for the abatement of the nuisance, including the necessary destruction of property.

"If a mill pond becomes offensive to a community, it is the duty of the local board of health to proceed at once to ask aid of the courts by filing a bill in chancery in its own name, to enjoin the further continuance of the nuisance, and decree its abatement. This last statement is taken from a decision by a court in the state of New York. In Michigan, the law, section 7965 Howell's Statutes, gives the Circuit Court *equity* jurisdiction concerning nuisances only 'where there is *not* a plain, adequate, and complete remedy at *law*'. Whether a business or a thing, not in itself a nuisance, is so managed or suffered to exist as to be a nuisance, is a fact which must be determined by the courts, upon evidence. In Michigan the law, §1640 Howell's Statutes, requires the *local board of health* 'to examine into *all* nuisances, sources of filth, and causes of sickness that, may, in their opinion, be injurious to the health of the inhabitants, and *destroy*, *remove*, or *prevent* the same as the case may require'.

"I have asked the attention of the president of the local board of health to this subject.

"If the local board of health refuses or neglects to make complaint for the abatement of a nuisance, *any person injured or annoyed thereby* may make complaint and prosecute a suit for the abatement of the nuisance as a public nuisance, or for damages by reason of the nuisance as a private nuisance, and for the abatement of the same. §1680 and §§7961-65 Howell's Statutes.

"I would suggest that the circuit judge be asked, at once, for an injunction to restrain the mill owners from lowering the level of the pond during the warm weather. Regular legal proceedings can then be instituted as I have indicated herein."

To the Secretary's letter, Mr. George L. Keeler, president of the village replied as follows:—

"Yours regarding the alleged nuisance caused by the lowering of mill pond during hot weather at this place received. In reply I will state that it is patent to everyone in this vicinity that the lowering of the pond by mill owners creates a terrible stench, and it is believed by many that this stench causes biliousness, loss of appetite and kindred diseases. However as this has been the case for many years and as the village is reluctant to injure the interests of the mill owners, the board feels that the chances of success in a suit would hardly warrant commencing. We believe however if the State Board of Health would write a kindly letter to the mill owners, T. D. French & Son, who are very estimable people, informing them that if the pond is raised and lowered so as to become dangerous to the health of the people (as we believe it really is) that the pond will need to be drained (which can be readily done) but which will injure their business, that they will hold the water to the height of the dam, at which height we think there will be no complaint.

"In your opinion could the village raise the dam and thus avoid all stench and at the same time benefit our factories by condemning lands overflowed and compel such land owners to accept *reasonable* and *just* compensation?

June 26, the Secretary again wrote as follows, to Mr. George L. Keeler:—

"Please accept thanks for your letter of June 25, replying to my letter relative to the alleged nuisance in the village of Middleville.

"I will endeavor to comply with your request for a kindly letter to T. D. French and Son.

"To the question you ask 'Could the Village raise the dam, and thus avoid all stench * * * and compel land owners to accept *reasonable* compensation?' I am not prepared to give an unqualified answer, I think however, that that would be impracticable. Perhaps it might be possible to have concerted action by public meeting and get the *consent* of land owners and a vote of the people to assess the amount? But, on this subject a good attorney should be consulted."

June 27, the Secretary wrote to T. D. French and Son, owners of the mill dam in question, as follows:—

"Complaint frequently reaches this Office of an alleged nuisance caused by the lowering of the mill-pond in Middleville during the hot weather.

"The law requires the local board of health to examine into all nuisances that may in their opinion be injurious to the health of the inhabitants, and 'destroy, remove or prevent the same as the case may require.' The law gives the circuit court *equity* jurisdiction concerning nuisances where there is not a plain, adequate, and complete remedy at law; and authorizes the court to grant 'injunctions to stay or prevent nuisances.' Under this section of law the circuit judge in this county has, some years ago, granted injunctions to restrain mill operators from lowering the water in the pond during hot weather.

"It has been suggested to this Office that possibly if your attention were called to the subject you might be willing to maintain the water in the pond at Middleville at the height of the dam, during the hot weather of summer. I think if you would decide to do this it would be a very good act for the interests of the public health."

At a later date, the president of the local board of health informed the Secretary of this Board that the plan suggested, of keeping the water in the pond at a given level, had been tried and proved satisfactory; and that no further complaints had been made in regard to the pond.

SAWDUST IN LITTLE MUSKEGON RIVER AN ALLEGED NUISANCE.

March 4, 1895, M. H. Boyd, supervisor and health officer of Deerfield township, Mecosta county, wrote to this Board stating that mill owners in said township throw sawdust into Little Muskegon river, that in hot weather the sawdust rots and emits a very offensive odor dangerous to the public health, and asking if there was any way of prohibiting this practice.

March 7, the Secretary replied to Mr. Boyd's communication by sending him copies of laws, and pamphlet publications of this Board, which contained the information asked for.

DEAD ANIMALS SOURCES OF ALLEGED NUISANCES.

Dead Horses on Tittabawassee River an Alleged Nuisance.

March 13, 1895, E. E. Curtis, M. D., health officer of Saginaw city, W. S., wrote to the Secretary of this Board, stating that in James township, two dead horses had been left on the ice on Tittabawassee river, which, if not removed before the ice went out, might endanger the purity of the water-supply of Saginaw city.

On receipt of Dr. Curtis' letter, the Secretary informed Mr. Isaac Parker, president of the board of health of James township, in which the alleged nuisance was situated, of the complaint made, and asked his attention to the subject. Continuing the Secretary wrote:—

"Section 9323 Howell's Statutes prohibits any person from putting the carcass of any dead animal into any lake, river, creek, pond, road, street, alley, or in any place within one mile of the residence of any person or persons, except that every part be buried at least two feet under ground. Every person offending shall be deemed guilty of a misdemeanor, and upon conviction shall forfeit a sum not less than five dollars nor more than ten, and costs, or imprisonment in the county jail not exceeding ten days.

March 20, Mr. Parker informed the Secretary that the offensive carcasses had been buried.

Carcass of Horse in Bath township an Alleged Nuisance.

March 30, 1895, complaint was received at this Office from Bath township, Clinton county, that a resident of that township had, uncovered, in his manure pile, within 200 feet of residents, the carcass of a horse which emitted odors alleged to be dangerous to the health of citizens residing in the vicinity.

The Secretary wrote to the president of the local board of health advising him of the alleged nuisance, and sending him copy of section 9323, Howell's Statutes, which bears on this subject.

April 4, the president of the local board of health wrote stating that the nuisance had been abated.

DAMS IN STREAMS, MILL PONDS, ETC., ALLEGED NUISANCES.

Dam in Coldwater River an Alleged Nuisance.

March 9, 1895, C. H. Sherman, supervisor of Nottawa township, Isabella county, wrote to this Board stating that the Mt. Pleasant Lumber Co. owns and operates a dam on Coldwater river for the purpose of flooding, to drive logs; and that said company floods a large tract of land which, in warm weather, causes a stench injurious to the public health. Mr. Sherman asks how the local authorities should proceed to abate this nuisance.

The Secretary sent Mr. Sherman printed matter containing the desired information.

Logs in Chippewa River an Alleged Nuisance.

May 6, 1895, J. R. Gardner, health officer of Sherman township, Isabella county, wrote to this Office stating that,—"The Chippewa river is filled with logs jammed in for two miles above Bundyville. The smell is almost intolerable and in my opinion is very injurious to the public health. I wish you would please inform me what to do in this case. The logs are owned by the Gale Lumber Co."

In reply to Mr. Sherman's letter, copies of laws, and pamphlet publications of this Board containing the information asked for, were sent to him.

Dam in Briley Township an Alleged Nuisance.

May 8, 1895, John McClenaghan, health officer of Briley township, Montmorency county, wrote to the Secretary of this Board, stating that a dam had been raised for the purpose of driving logs, which caused the water to overflow adjacent lands,—"and causes a very bad smell which is liable to cause fever. I would like to know what to do in such a case. They will be raising and lowering the water all summer."

The Secretary sent Mr. McClenaghan copies of laws and publications of this Board which indicated the duties of local boards of health relative to nuisances and the proper legal procedure necessary to their abatement.

Dam in Kalamazoo River an Alleged Nuisance.

July 8, 1895, a resident of Battle Creek city wrote to the Secretary of this Board as follows relative to an alleged nuisance in that city:—

"The Electric Light Comp'y or Street Car Comp'y, have used so much water of the natural stream that it has been drawn down and cut off by the use of a race from its natural source and the consequence is there has not a drop of water run over the dam and down the river bed for the past two months and the low water remaining in the river bed is becoming very foul.

"There is a very bad and offensive smell from not only the river bed but the pond above the dam and the people in the vicinity of pond and along the river banks are becoming alarmed and quite a number of them sick and they attribute it to the foul state of the water.

"This matter has been taken to our board of health, and our marshal ordered to shut down the gates of the race, which if done, would cause the water to overflow the dam and give us fresh water in the river, but *nothing has been done.* I ask you to kindly let me know what steps can be taken.

"I can get the signatures of a number of physicians who will say the water is foul and liable to breed a great amount of sickness."

On receipt of the above letter, the Secretary wrote to the complainant enclosing copies of sections of laws, and pamphlet publications of this Board, which explain the legal procedure to be adopted in the abatement of nuisances, and the duties of local boards of health in connection with nuisances.

Aug. 3, 1895, another resident of Battle Creek wrote to the Secretary relative to this nuisance as follows:—

"Several weeks ago Mr. C—— wrote you, stating the filthy condition of the Kalamazoo river. I have waited in hopes he would write you again, but he is still sick with typhoid fever.

"The following Sunday after receiving your letter, the board of health ordered the river flushed, and that is the *only time* this summer that the river has been high enough to carry off the stagnant water. Several different persons living along the river and also in the vicinity of the pond, back of the dam, have made complaint of the terribly unhealthy condition of the river, to members of the board of health, but they give it no attention. For the past two months it has been in a most filthy condition, being so offensive at night, we have been obliged to close our windows. Now *we* as residents along this river (and in fact the whole city is more or less contaminated with this poison) feel that we *must have* some action taken at once.

"Is there not some way in which we may have a *continual stream* of *flowing* water? If flushing the river is ordered for once a week or so, it only revives the vegetation growing in the river, and in twenty-four hours after the water becomes stagnant, the debris lodging in *this vegetation* to decay until another flushing is made.

"If the State would only compel this *dam* to be removed we would have a beautiful river of flowing water through our city continually.

"I have lived here eleven years and every year we have had a similar condition of this river, some years worse than others, but bad enough every year."

Aug. 5, 1895, the Secretary wrote to the Mayor of Battle Creek relative to this nuisance as follows:—

"Complaint reaches this Office of an alleged nuisance in the city of Battle Creek as follows:—

"That the water in the Kalamazoo river below the dam is so low that it will not carry off the filth, and that the filth accumulates and causes such a stench, as to compel the residents along the bank of the river to close their windows.

"Permit me to call your attention to the following."

That which followed was copies of Sections 1640 and 7965 Howell's Statutes. A pamphlet, "Work of Health Officers and Local Boards of Health in Michigan" was also sent to the Mayor.

Documents similar to those sent to the Mayor were sent to complainant.

Aug. 26, 1895, the last mentioned complainant again wrote to the Secretary as follows:—

"Your letter and pamphlets of Aug. 5, received in due time. I have done what I could to have our Board take some action to remove the alleged nuisance; but not one particle of attention have they given to it, and it is yet in this terrible condition, worse if anything, than it has been this whole summer through. In conversation with our Mayor, he said he was well aware of the condition and that he had done all in his power to remove the nuisance. He said he wished Dr. Baker would come here and investigate the matter himself. It did seem that something might be done. Our citizens are highly indignant that the State board does not look after this alleged nuisance, when they have been *several times* notified of its condition and when our local board *will not* comply with their duty. I cannot understand *why* the State Board *will not* come to our assistance when we ask you for it and have been asking for help all this summer. Now if you can do anything for us will you give it your immediate attention."

In response to the last-quoted letter, the Secretary wrote (Aug. 28) as follows:—

"Replying to your letter of August 26, relative to an alleged nuisance in Battle Creek, where the river is low causing a bad odor,—I note what you say about the citizens of Battle Creek being very indignant that the State board does not look after the nuisance. I am surprised to learn that, because it shows that they are so completely ignorant on the subject, for this office has done all it could to show to you and others in Battle Creek that the subject of nuisances in Battle Creek or any other locality, in Michigan, is not controlled by this Office or this Board. I will endeavor once more to state to you the facts as follows:—

"Section 1640 of Howell's Statutes requires the *local* board of health to examine into all nuisances, sources of filth and causes of sickness that may, in their opinion, be injurious to the health of the inhabitants, or destroy, remove or prevent the same as the case may require. If a nuisance is found in a public place it is the duty of the local board of health, to see to its immediate removal.

"If the local board of health refuses or neglects to make complaint you or any other citizen of Battle Creek injured or annoyed thereby may make complaint and prosecute a suit for the abatement of the nuisance as a public nuisance, or for damages by reason of the nuisance as a private nuisance, and for the abatement of the same.

"Section 7965 Howell's Statutes gives the circuit court equity jurisdiction in all matters concerning nuisances where there is not a plain, adequate and complete remedy at law; and authorizes the court to grant injunctions to stay or prevent nuisances. If the court is not in session application should be made to the judge.

"The law does *not* authorize the State Board of Health to interfere with local boards of health and duly-authorized courts who are charged under the law with everything connected with nuisances"

Alleged Nuisance in Kalamazoo City.

Sept. 21, 1895, a citizen of Kalamazoo, residing on Jackson street, wrote to the Secretary of this Board as follows:—

"I wish very much to call your attention to the unsanitary condition of this part of our city at present.

"There has been a large mill pond or ponds in the fifth ward, of this place, and as water was often low, the smell in the warm weather was very unpleasant. The city council bought the ponds so as to control them. 'The Land Improvement Company' bought a large tract of land through which the race ran, and they wanted the water drawn off. Accordingly the council ordered them emptied the early part of August, and the stench which followed was simply unbearable. The decaying vegetation and animal matter making a mass of slimy stagnant ooze. The city health officer protested when the work was first proposed, but for some reason has since changed his talk saying that the great amount of sickness near by is in no way due to the nuisance. While all the leading physicians predicted an epidemic which has since come to pass, as the terrible presence of malaria, typhoid, and scarlet fever together with several cases of diphtheria would indicate. The citizens of the ward petitioned the council to remove the nuisance. They sprinkled some copperas and a little lime, these did not affect the stench materially and then they ordered a layer of six inches of dirt spread over it. That was commenced and then the question was raised as to who owned the property and the work was stopped. Meanwhile sickness abounds. Now what should be done? Petitioning the city to abate the nuisance does not seem to be of any use. Have you any jurisdiction over such matters?

"Will you kindly advise me as to what should be done? We cannot understand why this condition of things is allowed to exist. If you wish to consult any of the leading physicians with regard to their opinions you might address Dr. J. M. Snook, Dr. Rush McNair, or Dr. H. B. Osborne, Dr. Schaberg, Dr. Rockwell or a host of others."

On receipt of the above letter the Secretary wrote to the writer informing him that this Board has no jurisdiction in connection with nuisances; but that the local board of health had such jurisdiction.

At the same time the Secretary wrote to the president of the local board of health informing him of the complaint made, and asking his attention to the subject.

Sept. 24, the Mayor of the city replied to the Secretary's letter to the president of the board of health, as follows:—

"Your communication addressed to the President of the Board of Health was referred to the City Clerk for reply. * * *.

"His letter in answer, which you will find enclosed, has been carefully examined by an informal meeting of the City Council sitting as a Board of Health and is a fair and impartial statement of the facts relative to the Ponds in question."

Following is copy of the clerk's letter referred to by the Mayor:—

"I have your favor of Sept. 23rd. relative to an alleged nuisance in the Fifth Ward of this City. In reply will say that the ponds in question have been looked upon for years by the authorities of this city as bordering on a nuisance, and, as a health measure, the city some time ago, purchased the water rights in them at a considerable expense and proceeded to drain them, thereby removing a serious menace as they considered, to the health of that locality.

"For a limited length of time after the water was drained out of them, there was an offensive odor arising from the ponds on account of decaying matter, but from the first, the city used every means in its power to deodorize and neutralize any possible serious effect resulting from the drainage of the ponds, and to the best of my belief, have done everything that was possible to abate any appearance of a nuisance at the time.

"At a regular meeting of the City Council held last evening prior to receiving your letter, as a further measure of safety, it was decided to sow the surface of these ponds with rye and grass seeds, with the hope that they would start immediately and that the growing of same would effectually remove all traces of unhealthy matter remaining. The authorities have used all diligence in this matter, and not a day has passed without one or more making a thorough investigation of the condition of the ponds, and have not been backward in adopting any measures which would seem to be of value in making them as unobjectionable as possible.

PRIVIES AND CESSPOOLS.

Cesspools in Union City Village Alleged Nuisances.

April 28, 1895, a citizen of Union City village wrote to the Secretary of this Board stating that a recently constructed cesspool in said village in close proximity to wells from which several families drew their water-supply, was likely to contaminate the water in said wells, and thereby endanger the public health; and asking "can anything be done about the cess-pool?"

In reply to the above-mentioned letter, May 1, the Secretary wrote to the complainant as follows:—

"Relative to the Cess-pool in the rear of the meat market on Hammond street, I send you herewith a copy of the pamphlet on the restriction and prevention of typhoid fever, in which I have marked parts bearing on the subject."

Copies of sections 1640 and 7965 Howell's Statutes, which bear on nuisances and their abatement, were also sent to the complainant.

On the same date a letter was sent from this Office to the president of the board of health of Union City village informing him of the complaint made and asking his attention to the subject.

In reply to the last-mentioned letter, May 14, the following letter was received from Dr. S. B. Frankhauser, health officer of the village:—

"In regard to complaints made from Union City, it is rather difficult to come to definite measures. The cesspool in question is as described to you—about 15 feet deep—in gravel soil, not cemented or in shape to be cleaned out, and undoubtedly is not a desirable thing; but the city furnishes no sewerage. * * * . We realize that our town is not in a hygienic condition. We are at present in the act of supplying the city with water and I think a sewer will be the next improvement, but in a place of this size all these things cannot be seen to at once.

"The board here is willing to do right but we thought it would be reasonable to have you know something aside of the complaint and then ask your advice."

Aug. 12, 1895, Dr. Frankhauser again wrote to the Secretary relative to a cesspool in his jurisdiction, as follows:—

"I wish to state to you a few facts in regard to a cesspool, now being made, for the purpose of getting your opinion *soon*.

"Geo. Gau of Union City is building a new house and arranging to use city water and cesspool for drainage and disposal of *all* waste products including water closet in the house.

"The cesspool is an old well which has been used for years and is still a good well. It is in front and on the south side of his house on High St. It is about 40 feet deep and his preparations are to drain all waste from the house into it. There are neighboring wells all around within three to five and ten rods. The neighbors are excited over it and look to the local board for protection.

"One of our attorneys here claims nothing can be done because he has not used it. But he tells us all that he intends to use it and of course would not build to it if he did not intend to. We claim it is a nuisance and a danger and a risk to public health and want to prohibit the *first* use of it, on the ground that it is possible it contaminate the neighboring wells and this done it would be impossible to purify them. Will you please answer at once."

Aug. 13, 1895, replying to Dr. Frankhauser's letter, the Secretary wrote as follows:—

"Your letter of August 12 is before me, for which please accept cordial thanks.

"Section 1640, Howell's Statutes, says:—'The Board of Health shall examine into all nuisances, sources of filth and causes of sickness, that may in their opinion, be injurious to the health of the inhabitants within their township, * * * and the same shall destroy, remove, or *prevent*, as the case may require.'

"You will notice that the law says 'prevent' 'causes of sickness.' I think your local board of health should meet at once and promptly take such action as shall 'prevent' the first use of the well as a cesspool, because after the first use there is no way whereby owners of wells in that vicinity can protect themselves from the possible infection of typhoid fever and possibly of other diseases of the intestinal tract.

"No person has any right to use such a well so as to endanger the health of people who use water from neighboring wells. I think there can be no doubt but what a person so using a well would be liable for heavy damages to every owner of a well in that vicinity.

"Any person who would so use a well for a cesspool ought also to be criminally liable under the law. Possibly he might be punished under the common law, but I know of no specific statute which would exactly fit the case. Section 9101, Howell's Statutes, provides that any person who shall wilfully poison any spring, well or other reservoir of water, shall be imprisoned in the State prison for life, or any number of years; but the *intent* would have to be proved, I suppose.

"I do not know the provisions of your charter, or whether your village is incorporated under the general law, but I think it almost certain that you will find in the charter authority for the council to 'prohibit' anything tending to cause or promote disease. I would recommend that you have the charter searched immediately, and, if the council has the power, to have an ordinance passed at once prohibiting, and providing a heavy penalty for violation, the fouling of any source of water supply and especially the general contamination of the underground water by any cesspool.

"I trust that the action of your board of health in this case will be prompt, and I shall be glad to be informed of the result."

Privies in Sherwood Village Alleged Nuisances.

May 31, 1895, C. E. Nelthorpe, M. D., health officer of Sherwood village, wrote to the Secretary of this Board as follows:—

"Sherwood has been afflicted for a couple of years with an epidemic of Malarial or Typho-malarial fever. It has again broken out this spring; about two weeks ago one person was taken sick and at the present writing there are five sick. The only cause to which we can attribute it is our water closet system the greater per cent being vaults. As soon as one is full the building is moved over another hole. The soil is sandy and gives ready filterage to all the watery contents of the vaults into the wells which on an average are not over 35 or 40 ft. deep. Now what we want to know is this: can we in any way compel the President or property owners here to put in a system of closets that can be cleaned out oftener or better than at present? Would like a full reply and instructions of what to do by Monday evening as our village council meets then and we would like to take immediate action."

June 1, 1895, the Secretary replied as follows to Dr. Nelthorpe's letter:—

"Replying to your letter of May 31, relative to typho-malarial fever and the condition of your privy system in your village, I will endeavor to secure and send you a copy of the Lansing ordinance relative to privies and privy-vaults. I would advise your village council or the village board of health to frame and adopt an ordinance or 'regulation' under 1636 Howell's Statutes, which shall regulate the closet system.

"I could not get a copy of the ordinance to send, but will copy section 12, which is as follows:—

"Sec. 12. No privy shall be emptied between the fifteenth day of June and the fifteenth day of September, unless by written permission of the city physician or a member of the board of health. No person or persons, company, or corporation within the limits of the city of Lansing shall hereafter erect or maintain any privy with a vault beneath the surface of the ground, or without a drawer, box, or water-tight receptacle, constructed so as to be drawn out and cleaned of its contents, and said box, drawer or receptacle shall be lined with galvanized iron, zinc, or tin, and that no such drawer, box, or receptacle shall be used for the purpose for which it was constructed unless dry earth or ashes are used daily, or sulphate of iron, or other equally as good disinfectants, as often as occasion may require. But nothing in this section shall be construed to prohibit any person from constructing or maintaining a privy or water-closet that is constructed with, or that may be attached to, the public sewer or sewers construction by the consent of the sewer commissioners."

June 11, Dr. Nelthorpe again wrote to the Secretary on this subject, as follows:—

"I wrote you some time ago in regard to the water supply and the Privy vault system of the Village of Sherwood and expected a reply from the State Board of Health but received a few printed leaflets in regard to typhoid fever.

"Sherwood has most every spring, summer and fall attacks of malarial fever of one form or another while some of the surrounding towns rarely have a case of any fever of that nature.

"Now the Board of Health of this place would like to know to a certainty if it is caused by our Privy Vault system the greater per cent being simply a vault 5 or 6 feet deep curbed on sides with plank or boards. We thought it best to have some of the water sent to the University for analysis. Shall we send them to V. C. Vaughan and what would be the expense? or can you suggest some plan to pursue that will throw any light upon the subject. Please advise us the best course to pursue."

In reply to Dr. Nelthorpe's second letter, the Secretary wrote as follows, June 12, 1895:—

"Your letter of June 11, came to this office this morning. It does not seem possible that you could have received my letter of June 1, of which the following is a copy. * * * * * *.

"I think the uncemented privy vault an exceedingly bad thing for the health of any locality, and especially a menace to the life and health of every citizen in your village if the wells are relied upon as a source of water supply.

"The water from the wells might be examined, but that would not necessarily show the cause of the typho-malarial fever, I would rely upon the facts set forth in your statements. Because if the fevers occur, that is of itself evidence. However, an examination might show the cause. If there was to be an examination it should be a bacteriological one to see whether or not the specific germ can be found, as well as a chemical analysis which should prove whether or not the privies leach their contents into the water in the wells. Such examinations are made at the State Laboratory of Hygiene at cost, which I understand is about ten dollars per sample, for the bacteriological part. If you desire examinations made you should first arrange with Doctor V. C. Vaughan, the director of the Laboratory at Ann Arbor, Michigan, as he has certain instructions for gathering and sending the samples.

"Your village ought to do one of two things: give up the vault system, or give up the wells for water. If your village does not prohibit privy vaults, it should certainly have a general water supply from a source free from contamination.

"This Office usually considers typho-malarial fever as typhoid, and in the majority, if not in all cases, it probably is. There is probably direct relation between your so-called typho-malarial fever and the privy-vault system, and immediate steps should be taken to remedy the difficulty.

"If this Office can be of service to you, it will give me pleasure."

Privy Vault Nuisance in Yale Village.

Aug. 5, 1895, C. V. High, M. D., health officer of Yale village, St. Clair county, wrote to the Secretary of this Board as follows:—

"I have made considerable effort in abating nuisances (*e. g.*) privy vaults, etc., and the object in writing to you is to obtain your opinion regarding one point.

"I will enclose a notice I had printed on the strength of the language of our village charter, which explicitly informs us that we can enforce the last paragraph; but an attorney here is doubtful. I have had no trouble with any so far and have made splendid progress, but am going to tackle the delinquents as soon as I can be sure I am supported. Please tell me if you can, if I can enforce same. * * *. Knowing that your experience in such matters is great, thought you would know about the point at issue."

Following is the notice mentioned in Dr. High's letter:—

VILLAGE OF YALE, }
County of St. Clare. }

Yale, Mich, ... 189....

To..

NOTICE IS HEREBY GIVEN, That in order to avoid contamination of water supply, etc., and for the preservation of Public Health, you MUST have your Privy Vault cleaned AT ONCE.

This is an important matter and upon failure to comply with the requirements of the above notice, said work will be attended to by the Health Board at your expense.

By Order of Village Health Board.

In reply to Dr. High's letter, Aug. 12, the Secretary wrote as follows:—

"Your letter of August 5, enclosing notice relative to privy vaults is before me, for which please accept thanks.

"Your question as to the enforcement of the notice is a question of law which I do not care to answer, as I am not a lawyer. I should think, however, that you had better get the opinion of some good lawyer upon the subject. I do not know under what law your village is incorporated."

Privy Vault in Lansing City, an Alleged Nuisance.

Aug. 5, 1895, a resident of Lansing complained to this Office of a foul privy vault situated at the south-east corner of Hosmer and Vine streets. The complaint was referred to the proper local authorities, and the nuisance was abated.

Contamination of Wells by Privies in Big Rapids.

Oct. 8, 1895, E. A. Romig, M. D., health officer of Big Rapids city, wrote as follows to the Secretary of this Board relative to a privy in that city:—

> "We have a condition of affairs which our board of health are in doubt how to proceed with. A party owning a well, said to be 40 or 50 feet deep, has placed a privy over it and is using it for a vault, another party has had to fill up his well—about 125 feet distant and toward the river—and still others are complaining that their wells are rendered unfit for use. I understand the well has been used for a vault for some years and am not sure but it may have been a cause for complaint to the State Board of Health before. The question seems to be can the party be compelled to abate the nuisance and how to proceed."

Oct. 9, in reply to Dr. Romig's letter, the Secretary wrote as follows:—

> "Replying to your letter of Oct. 8, relative to the action of the local board of health with regard to a well that is being used as a privy vault and which has contaminated surrounding wells, I would recommend your local board of health to declare the well a nuisance. I think the alleged nuisance can be and should be abated; but the wells are probably irretrievably ruined."

A Privy Vault in Clinton Village, an Alleged Nuisance.

Nov. 12, 1895, complaint was made to the Secretary of this Board by a citizen of Clinton village, Lenawee county, that a neighbor's privy, in close proximity to his (complainant's) well was a nuisance.

By letter dated Nov. 14, 1895, the Secretary informed the president of the board of health of Clinton, of the complaint made, and asked his attention to the subject.

In reply to the Secretary's letter, the president of the village, by letter, dated Nov. 19, stated that the local board of health had investigated the circumstances connected with this alleged nuisance and had made such decisions relative thereto as, in their judgment seem right and proper.

A Privy in Mason City, an Alleged Nuisance.

Nov. 21, 1895, a resident of Mason complained to the Secretary of this Board that a privy on a neighbor's premises was a nuisance and had been cause of typhoid fever.

The Secretary informed the president of the local board of health of the complaint made and asked his attention to the subject.

Dec. 2, the health officer of the city wrote to the Secretary stating that the alleged nuisance had been investigated and that there did not exist any ground for complaint.

Privy-vault and Dry-earth Closet disposal of Excreta in Bronson Village.

A change from vault or ground storage system to dry-earth system of disposal of excreta in the village of Bronson being under consideration, July 15, 1895, Jno. E. Outwater, M. D., health officer of the village, sent the following series of questions to the Secretary of this Board:—

"1. When property within the village limits is mortgaged for its full value and rented, out of what or whom would the costs of a suit come if the village board were compelled to remove by law any cesspool or contents of privy on said property?

"2. Are we obliged to remove contents of privy vaults during the night? The privy vaults in this village range in depth from 4 to 10 feet. Wells of drinking water from 11 to 35 feet, average depth 18 feet, and many of them within 15 feet of said vaults, soil of rather coarse gravel, and the contents of many of the vaults have not been removed in from 6 to 15 years and some of them are running over. Water is found 9½ feet below the surface.

"3. Does the village board possess the legal power to prevent the covering up of privy vaults that have not been cleaned for many years? In other words can the village board enact an ordinance preventing the burying of contents of said vaults within the village limits?

"4. After contents of vaults have been removed is it necessary to disinfect said vaults? and if so with what, and at whose expense?

"5. Are we obliged to wait until a privy vault is full or the stench great before ordering it cleaned?"

July 17 and 30, Dr. Outwater supplemented the above series of questions by the following two:—

"6. Is it advisable to clean out the privy vaults at this time of the year?

"7. Can the village board pass an ordinance that would be constitutional to compel the cleaning out and filling up of the vaults, and the use of water-tight drawers with the dry-earth system in their place?"

In answer to the foregoing questions the Secretary wrote:—

"1. Relative to costs of a suit against mortgaged property, I would suggest that you ask the village attorney. I presume a tax would be levied on the property, to amount of costs of removing nuisance.

"2. You are not obliged to remove contents of privy during night. And that is not the best time either.

"3. Yes. By '*regulations*' the village board can regulate privy vaults. Your village board better not permit a vault to be constructed.

"4. Yes. The vault should be disinfected before and after removal of contents, with chloride of lim (see marked copy of pamphlet on typhoid fever sent you herewith.) The board of health should disinfect, or see that the disinfection is done.

"5. Your board of health need not wait until a vault gives off a bad odor before ordering it cleaned. The board should regulate the privy nuisance by 'regulations'. I send you herewith a copy of a section of the Lansing ordinances relative to privies, which I hope may be of use to you. I also send a number of publications relative to nuisances, etc.

"6. It would depend on what you wish to accomplish. If you wish to prevent the spread of typhoid fever, which is the disease usually spread by privy contents, I should recommend you to comply strictly with the recommendations in the pamphlet relative to the restriction and prevention of typhoid fever.

"7. I do not know of any reason why they should not do so, and I herewith enclose copy of section 12 of an ordinance relative to privy vaults, in the city of Lansing. You may be able to improve upon it."

PUMICE FROM A CIDER MILL.

June 13, 1895, John J. Milbourn, recorder of Eaton Rapids, wrote to this Board as follows:—

"The board of health here wished me to enquire of you what the result would be of leaving 6 or 7 hundred wagon loads of Pumice from a cider mill on top of the ground.

"The mass is slowly decaying but does not give off an unpleasant smell.

"If detrimental to health (which we suppose it must be) what diseases are liable to result from it?"

Following is the reply sent to Mr. Milbourn's inquiry:—

"Replying to your letter of June 13, relative to 6 or 7 hundred loads of pumice from cider mill in a state of decomposition, I know of *no disease* caused by emanations from pumice; but, of course, it does not follow that sickness or disagreeable sensation is not caused by decomposing pumice. I would be inclined to think that such a mass of decaying material might, possibly, be dangerous to the public health, and it may be a nuisance."

DRAINS AND DRAINAGE.

Drain in Plymouth village, an Alleged Nuisance.

July 4, 1895, H. H. Merriman, M. D., health officer of Plymouth village, wrote to the Secretary of this Board as follows:—

> "I wish your opinion regarding my duty in a case of a nuisance reported to me. Our village president reported a drain from a vault and saloon running into a small creek, and ordered me to have it stopped. I looked and smelled about the drain, and found nothing particularly worse below than above, and waited to report to the council. During this time the President again ordered me to 'abate' the nuisance, insisting that I had the authority. I stated to him how I found it, and a meeting of the council last Monday night was held at which, I am told, 'they voted to have the drain stopped within 24 hours'. The marshal ordered it done and the owners did it. I wish to know if I did my duty. If not how different I must do another time."

July 5, replying to Dr. Merriman's letter the Secretary wrote:—

> "Replying to your letter of July 4, I send you herewith a pamphlet on the work of health officers, in which I have marked parts bearing on the question in regard to actions in connection with the alleged nuisance in Plymouth where there is a drain from a vault and a saloon.
>
> "No *one* man or officer can order a nuisance abated, except it is by the direction of the *local board of health.* It is the duty of the local board of health to examine into alleged nuisances, and to act, *as a board*, to remove or abate the same as the case may require."

Fish Offal in Petoskey, an Alleged Nuisance.

In 1894, complaint was made to the Secretary of this Board that insufficiently buried fish offal in the village of Petoskey, was a nuisance. The Secretary then called the attention of the health officials of the village to the complaint; and in July, 1895 the complainant informed the Secretary that the nuisance had been abated. In November 1895 the same complainant wrote to the Secretary that the objectionable practice of insufficiently burying fish offal had been again resorted to, and that two deaths from typhoid fever had occurred in the immediate vicinity. On receipt of this information, the Secretary communicated the facts to the president of the local board of health and requested his attention to the subject.

COMMERCIAL FERTILIZER, AN ALLEGED NUISANCE.

July 23, 1895, P. B. Hardy, M. D., health officer of Ridgeway township, Lenawee county, wrote to the Secretary of this Board as follows:—

> "Ten tons of phosphate have been stored in a building within 100 feet from one dwelling and about 150 feet from another, for over one year. The neighbors have petitioned our board to cause its removal on the ground of nuisance.
>
> "We sent the company (in Chicago) a notice and received an insulting letter in reply.
>
> "Is there any law governing the storage of phosphate? I have been unable to find such."

In reply to Dr. Hardy's letter, July 25 by letter from this Office he was referred to sections 1640 and 7965, Howell's Statutes, copies of which were sent to him.

PROBABLE CONTAMINATION OF WATER-SUPPLY IN FREMONT VILLAGE.

Aug. 17, 1895, Van N. Miller, M. D., health officer of Fremont village, Newaygo county, wrote to the Secretary of this Board as follows relative to the water-supply of that village:—

"We get our water supply from flowing, drive, tubular wells from 44 to 84 feet deep. Pump house is about 4 to 8 rods from wells and between pump house and wells runs a creek with valve to turn on creek water in case of fire. When the spring water alone is on there is no better drinking (or tasting) water than ours. Now on the banks of the creek are several 'Privies' and all of the excrement drops into the creek. 'Can I have them removed'?

"Second, a cellar under a large dry goods and general store has from 6 to 36 inches of water in it all the time. 'Can I do anything about it?' "

Aug. 19, replying to Dr. Miller's letter, the Secretary wrote:—

"Relative to the water supply, there should be a sufficient number of wells to supply all demands in case of fire, so that there would be no necessity of turning in the creek water and *thus contaminating the whole water supply of the village.* Until that is done, you ask 'can I have them removed?' referring to privies on the banks of the creek. The health officer alone cannot do this. You should advise your local board of health to make and publish regulations which shall forbid any privy being placed or maintained within a stated distance of said stream, and which shall effectually guard the purity of said stream. The subject is of great importance, as you might have a wide-spread epidemic of typhoid fever in your village through the use of contaminated water.

"If the cellar containing from six to thirty-six inches of water is believed to be a nuisance by the local board of health, the *board* can order it abated."

ALLEGED UNSANITARY CONDITIONS IN BARAGA VILLAGE.

Oct. 10, 1895, a resident of Baraga village, Baraga county, wrote to the Secretary of this Board as follows relative to unsanitary conditions in that village:—

"I wish to call your attention to the unhealthful condition of Baraga at the present time. During the past year the outhouses have not been attended to. The drainage is fearful, the pipes which carry the water back into the town are such a short distance from each other that the drainage from the outhouses is drawn into the water pipes; as a natural consequence, the water both smells and tastes bad. At present there are quite a number of cases of typhoid fever and one of diphtheria; the cases are not placarded."

Oct. 12, the Secretary, by letter, informed the president of the village, who is president of the local board of health, of the complaint made, and asked his attention to the subject. At the same time the Secretary called the attention of the president to the fact that "no health officer has been returned to this office as the law requires."

Oct. 14, the president of the local board of health replied to the Secretary's letter substantially as follows:—

"Your letter of Oct. 12 has been received. I am a little surprised at the tone of it as I supposed the village was in a very healthful condition. There is not as much sickness this fall as usual. Fevers of a malarial type have always been prevalent since I located here about four years ago; but seem to be of the same character as prevail in all new places. Drainage is bad here as there has not been time nor money to have system of sewerage. There is but one public sewer that can be called such, all others are on private grounds or mostly so, made while under township rule. The village is too young yet to do better. Such complaints as have come to our knowledge have been attended to according to the best of our means and opportunity. The health officer has notified persons to abate nuisances where known. He has not been negligent. * * *. If you will give me the names of the persons who have complained to you, I will see them personally. * * *. We only pay the health officer $25 per year. The practicing doctor would not take it for that and after a time the council appointed Richard Fever. The duties have been performed better and at less expense than at any time since I have been a resident. The only bad thing to be remarked this fall is the sewer and that cannot be done unless we can get men to work for patriotism and that is hard to do in this country. Our taxes here (outside of the village tax) were six per cent on valuation last year. The people can stand no more and we must have time now to gather the necessary funds for doing public work. We intend to get along this fall by patching things up and compelling people to clean up at private expense and not public as heretofore. The water should be all right as the pipes were extended out into the lake two years ago. The water is taken from the Bay about 1.200 feet from the mouth of the sewer spoken of, except at times when fire pressure is put on. I am informed that then a small pump is added taking water from the mill boom which has no connection with the sewer. The Nestor estate furnishes the water to the pipes. They were put in by the township of Baraga and turned over to the village. The village has nothing to do with the use of water for private consumption at present, as they have no water tax and it has been free for all. Every one who desired has had privilege of tapping the pipes and use of water free. The village only uses it for fire purposes and pays by the year. We have not got around to the control of the use of the water yet and the ones who use it are doing the same as if they lived near a lake or small stream by helping themselves. We have no contagious diseases in the village at present except one case of scarlet fever that was contracted in Houghton or Hancock. The case was quarantined and we expect no danger to others. The diphtheria mentioned was of a very mild form. It was last July. I am strongly of opinion that it was an aggravated case of sore throat. The parties were quarantined and there were no further cases. The doctors have always said, when I have asked them, that there was not much sickness. I just called on Dr. Turner of L'Anse, who has the largest practice here and he informed me that the village was more healthy than usual. He said there are two cases of typhoid fever at Boarding House and two at Chappell House. I asked him if it was of a bad type and he said it is the kind usually known as the bilious or malarial fever, and commonly called here 'Baraga fever'. Dr. Turner is County Physician and we have occasion to call on him in a few cases of contagious diseases for parties who were in indigent circumstances and were necessarily a county charge. * * *. I have notified the village clerk to fill blank you sent notifying of the appointment of the health officer. It must have been his neglect that you had no notice before."

Sewer in Ithaca village, an Alleged Nuisance.

Dec. 23, 1895, a resident of Ithaca village wrote as follows to the President of this Board:—

"We have a sewer that commences in the upper part of the village and branches that run into the same, and the whole empties in the lower part of the town overflowing several lots and filling cellars and wells which causes sickness, and in warm weather causes a horrid stench. * * *. There is plenty chance to drain the same by a small expense."

The Secretary wrote to the president of the local board of health informing him of the complaint made and asking his attention to the subject.

In reply to the Secretary's letter the president wrote:—

"Your letter rec'd. In reply would say I am well aware that the sewerage here is not what it should be and I am aware also that as Ithaca is located it would cost $40,000.00 to put in a proper system of sewerage. It would then be a very expensive system to maintain as we have no natural outlet, and sewerage disposal works is the only way I can see to take care of it. At the present time our village is unable to meet such an expense. However, we have no trouble to speak of, except in heavy rain falls, when it does flood a good many cellars, but there is no stench as it is only surface water. We use all means possible to prevent sickness, and there is no place within the village at present that I consider dangerous to the public health. If you will refer me to the case you have received complaint from, I will see that it is properly looked into."

PROPOSED WELL IN SCHOOL YARD NEAR A CEMETERY.

Sept. 4, 1895, G. S. Townsend, M. D., health officer of Belvidere township, Montcalm county, wrote as follows to the Secretary of this Board:—

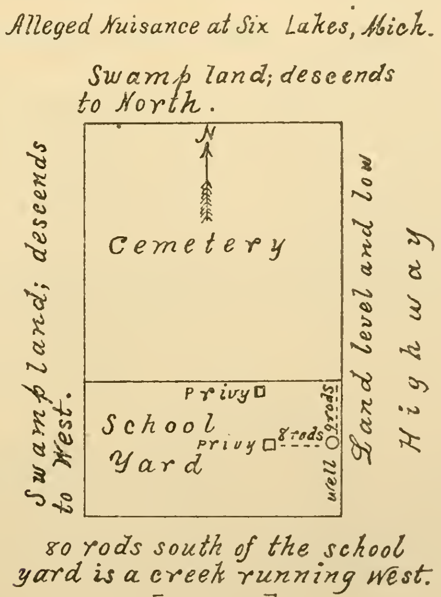
"I write to you in regard to putting a well in a school yard adjoining a burying ground. There are some in the district in favor of putting it in the school yard and others who are not. The School Board come to me for advice. I told them I would refer the matter to you and await your reply. On opposite side of this sheet you will find diagram. The director tells me that he has noticed (when digging graves) that the water courses all run in a westerly direction, as you will notice by the diagram, away from the would-be well. This well is to be cement."

Following is copy of diagram referred to.

Sept. 6, in reply to Dr. Townsend's letter, the Secretary wrote:—

"Replying to your letter of Sept. 4, relative to a new well in the school yard, I have read your letter carefully and have examined the diagram on the back of your letter. This seems to be a dangerous location for a well. And it is not a very safe location for a school yard, so near a cemetery.

"Herewith I send you a copy of our pamphlet on the restriction and prevention of typhoid fever in which I have marked parts bearing on the danger of locating a well near a cemetery."


Alleged Nuisance at Six Lakes, Mich.
Swamp land; descends to North.
N
Cemetery
Swamp land; descends to West.
Land level and low
Highway
Privy
School Yard
Privy
8 rods
2 rods
well
80 rods south of the school yard is a creek running West.

[PLATE 886]

Alleged Nuisance in Berlin township, Monroe county.

Parties living in Berlin township, Monroe county, made complaint to this Office that garbage from the city of Detroit was being thrown into Detroit river and later was washed up on the Lake Erie shore of said township, where it decomposed and became a nuisance to the residents along the shore.

July 8, 1895, H. A. Lockwood, Prosecuting Attorney of Monroe county, telegraphed the Secretary of this Board as follows:—

"Parties from Detroit are dumping large quantities of garbage and offal off shore of Berlin township. It is creating a great nuisance being washed up on shore; something ought to be done at once."

In the absence of the Secretary, the above-quoted telegram was referred to Hon. Frank Wells, Pres. of the Board, who answered that the Board had no jurisdiction in the abatement of nuisances, and referred Mr. Lockwood to Section 7965, Howell's Statutes, which defines the recourse to law which can be had in these cases.

Dr. J. P. Reed, of Berlin township, wrote the Secretary of this Board, July 15, relative to the alleged nuisance in that township, as follows:—

"Not knowing to whom to write for information, I address you.—I was called last night to the club house at the mouth of Huron River, and there I found that the parties who have the contract for disposing of the garbage of Detroit city, have been unloading the garbage of all descriptions, from Trenton down the Detroit River to the Bay in front of the club house. I never saw such offal. The shore is lined with dogs, cats, pigs, and slaughter-house waste-material; so much so you can smell it for a long distance. The shore has more dead fish than I ever saw upon it before. Whether this is caused from the garbage or the soda-ash at Trenton, I cannot tell, but will you please notify the parties, if known to you, not to dump or unload any more in the Detroit River, and every human being will be under many obligations to you."

The Secretary of this Board answered the above-quoted letter from Dr. J. F. Reed, July 16, as follows:—

"Replying to your letter of July 15, relative to Detroit parties dumping garbage and offal in the Detroit river which causes a nuisance in Berlin Tp., I have several times of late been asked to take action, and have replied each time. But this morning I have placed the subject before the Attorney General who will be here tomorrow, and I have also placed the subject before the Prosecuting Attorney of Wayne county. I should recommend the local board of health of Berlin township, to proceed under sections 1640 and 1645 of Howell's Statutes.

"Section 1645 is as follows:—'Such justice may thereupon issue a warrant directed to the sheriff or any constable of the county, commanding him to take sufficient aid, and being accompanied by any two or more members of said board of health, between the hours of sunrise and sunset, to repair to the place where such nuisance, source of filth, or cause of sickness complained of may be, and the same destroy, remove, or prevent, under the direction of such members of the board of health'."

"Detroit Sanitary Works" an Alleged Nuisance in Van Buren township, Wayne county.

In 1895 complaints were made to this Board by residents of Van Buren and Huron townships, in Wayne county, and of Berlin township in Monroe county, alleging that the "Detroit Sanitary Works", located at French Landing, Van Buren township, was a nuisance and a menace to the public health. The stench from the "works" was complained of by persons living near. Others alleged that the Huron River water was contaminated by refuse matter, thrown into the stream at the "works", so that cattle and horses would not drink the water; the fish in the stream were dying and lay decomposing along the banks.

The correspondence relating to this matter is too extensive for publication, but some of the most important communications are given below.

Feb. 23, 1895, Samuel Adams, supervisor of Huron township, Wayne county and M. R. Nowland a citizen of the township, each wrote to the Secretary of this Board relative to the alleged nuisance caused by the Detroit Sanitary Works; their letters were as follows:—

Letter from Mr. Adams—

"I write you to ascertain what action is necessary and what steps should be taken to abate a public nuisance?

"The nuisance is located in the township of Van Buren, and is known as the Detroit Sanitary Works. It is located on the Huron River, and said river traverses through the township of Huron in which town I live. All the refuse from the garbage from the city of Detroit is run into the river, and parties along the river are complaining, as their stock will not drink the water. In a dry time it is necessary for some [persons] to use the water in their homes for cooking purposes, and besides the smell is very bad. It is driving the fish out of the little stream."

M. R. Nowland's letter was substantially the same as the one above-quoted, from Mr. Adams. Feb. 25. the Secretary of this Board wrote in answer to these letters. and also notified the Supervisor of Van Buren township, of the alleged nuisance in his jurisdiction; he called their attention to Sections 1640 and 7965, Howell's Statutes and sent them literature on the subject of the abatement of nuisances.

Feb. 28, 1895, M. H. Chamberlain, Manager of the Detroit Sanitary Works, wrote the Secretary of this Board, alleging that the complaints made against the "Works" were instigated by parties who were interested in securing a contract from the city of Detroit for the disposal of the city garbage. The following is quoted from Mr. Chamberlain's letter:—

"Our present contract with the city of Detroit expires on the 1st of July next. The Common Council have now the matter of making a new contract under consideration; having directed the Controller to advertise for the same.

"We are firmly in the belief and we think we shall be able to prove in a few days, that this complaint is promoted by parties interested in securing the contract from the city of Detroit, with a view to affect the permanency of our business in the City of Detroit, and particularly with members of the Common Council.

"The parties who are seeking the contract with the city of Detroit, we are thoroughly advised have schemes for dumping it in the lakes and rivers; feeding to animals or dumping and burying in some localities contiguous to the city. These are all mere makeshift schemes by people who are not at all conversant with the situation, and while being entirely unsanitary, especially the feeding to animals and dumping in the river, would, long before the contract is out no doubt involve the City of Detroit in danger and trouble in reference to her garbage."

March 1, 1895, the Secretary of this Board answered the above-quoted letter from Mr. Chamberlain, as follows:—

"Replying to your letter of 28th. of Feb , relative to the allegation that the Detroit Sanitary Works is a nuisance, I send you by this mail a pamphlet on the Disposal of Waste and Garbage and some pamphlets relative to the subject of nuisances.

"Several complaints have been made to this Office from Huron and from Van Buren townships, and they have been replied to by using the usual letters, copies of which I send you herewith."

Wm. A. Haak, Clerk of the Board of Health of Van Buren township, wrote to the Secretary of this Board, March 15, 1895, as follows:—

"Your favor of the 25 ult. to Supervisor Jasper Moore of Van Buren Township was duly received and by him laid before the Board of Health of said Township, and although it was a great surprise to them, a meeting of said Board was called at the Detroit Sanitary Works, there were present Health Officer, Dr. C——, Supervisor M——, Justice C——, and Township Clerk H——, and a number of citizens residing near said works and owning land along the river below said works. And although word of said meeting had been sent to parties in Huron township who were known to be interested in said complaint, they were conspicuous by their absence. The Board of Health and Health Officer then went all through the works and took the testimony of citizens living in the immediate vicinity of the works and found that the complaint is erroneous and that the refuse is not run into the river, that the stock owned by farmers below the works and in the immediate vicinity and for 4 miles down the stream do not refuse to drink the water, that there is no bad smell from the river by reason of anything that comes from the works; that fishing below the works is as good as above, and that no fish are being driven from the river. And that as the neighboring farmers in the immediate vicinity of the works are finding no fault, the verdict of the Board is, that they find no nuisance on the premises of the Detroit Sanitary Works, and so have instructed the Clerk to transmit to the Secretary of the State Board of Health a written statement of the facts as above set forth."

Aug. 21, a petition was sent to this Office signed by 46 residents of Van Buren township, alleging that the Detroit Sanitary Works was a nuisance and requesting that this Board make an investigation of the plant and secure the abatement of the nuisance.

B. Arnold, M. D., of Denton, wrote to the Secretary of this Board, Sept. 23, stating relative to the methods employed at the garbage plant as follows:—

"The garbage is cooked by steam in tight boilers for four or five hours, then it is dried preparatory to making phosphate of it. Now in drying some of the vapor escapes, making a terrible stench, so much so that it annoys the people for some distance around.

"I do not think that it injures the health of the community, as the steam sterilizes it perfectly and any vapor must be aseptic, from the action of the heat.

"Now the stench is a nuisance, but as it is not detrimental to health has the health board any jurisdiction in the matter, if so how must they act?"

The Secretary of this Board wrote, Sept. 23, in answer to the above-quoted letter from Dr. Arnold, as follows:—

"Replying to your letter of Sept. 21, while the vapor from the garbage works may not be the cause of a specific disease or of specific sickness, anything with such a terrible stench is certainly a nuisance, and should be so dealt with by the board of health. A nuisance is a thing which causes discomfort, and discomfort is not a condition of perfect health of body and mind."

Dr. Arnold wrote again Sept. 30, as follows:—

"I will give you the result of all our trouble.

"Board of health held a meeting at Belleville, Sept. 28th. The advice from the prosecuting attorney of Wayne county was that we had nothing to do with the garbage works if it was not detrimental to health.

"The prosecuting attorney said that numbers had been to see him upon the subject and he had told them what to do 'give it to a lawyer of Chancery'.

"We concluded to follow your advice, in part. We decided it was a nuisance, that is the vapor and stench, and ordered it abated in sixty days. The weather will be cold by that time, so that it (the nuisance) will abate itself.

"The works have run a sediment into the Huron River, killing the fish and polluting the stream so that a stench arises from the water. The Huron is said to be a navigable stream, under control of the United States. Has the local board of health any authority to prevent the pollution of the stream or remove a nuisance in it?"

In answering the above-quoted letter, the Secretary of this Board stated as follows:—

"Relative to the pollution of Huron river by the Detroit Sanitary Works. The fact that the stream is owned by the United States will not prevent the local board of health from abating the nuisance."

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* It has been customary previous to 1894 to place the name of each observer, and the location represented, in the index, but on account of the great number, this has been omitted, and reference only to Exhibit V is made in the index.

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ERRATA.

On page 22, in the top of third column of table "Year 1894" should read "Year 1895."

On page 423, under the sub-head "Consumption.—Age of Occurrence," the beginning of first line Table 18" should read "Table 16."

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